Draft Environmental Assessment for the Relocation of the Airport Traffic Control Tower

San Francisco International Airport

PREPARED FOR:

CITY AND COUNTY OF SAN FRANCISCO, CALIFORNIA

APRIL 2011

RICONDO & ASSOCIATES

In association with:

AGS, Inc.

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I. Purpose and Need

1.1 Introduction

San Francisco International Airport (SFO or the Airport), which served approximately 39 million domestic and international passengers in 2010, is located 13 miles south of downtown San Francisco. SFO is classified as a large-hub commercial service airport in the National Plan of Integrated Airport Systems (NPIAS). Hub classifications are based on the number of passengers enplaned at the Airport, and a "large hub" classification means that SFO accommodates at least 1.0 percent of total U.S. enplaned passengers, ranking it as one of the nation's busiest airports.[1] The Airport is owned and operated by the City and County of San Francisco (CCSF), acting by and through the San Francisco Airport Commission (the Commission).

The CCSF, on behalf of the Federal Aviation Administration (FAA), initiated the preparation of an Environmental Assessment (EA) of the relocation of the existing Airport Traffic Control Tower (ATCT or the Tower). The CCSF through the Commission owns and maintains the existing ATCT building, which is leased to the FAA. In compliance with the National Environmental Policy Act of 1969 (NEPA, 42 United States Code [U.S.C.] 4321-4370h), the FAA must review the potential environmental effects of a proposed project before taking any action to approve the proposed project. The FAA has established a process to ensure compliance with the provisions of NEPA through FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*.[2] FAA Order 1050.1E, paragraph 401(g) identifies the establishment or relocation of an ATCT as an action that typically requires an EA.

NEPA requires federal agencies to prepare environmental documentation that discloses to decision makers and the interested public a clear, accurate description of potential environmental effects resulting from proposed federal actions and reasonable alternatives to those actions. Through NEPA, the U.S. Congress directed federal agencies to integrate environmental factors in their planning and decision-making processes and to encourage and facilitate public involvement in decisions that affect the quality of the human environment. Federal agencies are required to consider the environmental effects of a proposed action, alternatives to the proposed action, and a no action alternative (assessing the potential environmental effects of not undertaking the proposed action).

The CCSF is preparing this EA on behalf of the FAA in compliance with FAA Order 1050.1E to evaluate the potential environmental impacts of relocating the ATCT at SFO, which is the "Proposed Action" evaluated in this EA. Relocation of the ATCT would not affect (increase or decrease) the number of aircraft operations accommodated at SFO or the routing of aircraft in the air or on the ground at the Airport. Implementation of the Proposed Action at SFO would result in the FAA being able to continue to carry out its statutory mission to ensure that the safe operation of the airport and airway system is the highest aviation priority.[3]

The purpose of and need for the Proposed Action are described in this chapter, along with background information and a description of the Proposed Action.

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1 U.S. Department of Transportation, Federal Aviation Administration, *Report to Congress: National Plan of Integrated Airport Systems (NPIAS), 2011-2015,* September 27, 2010.

2 U.S. Department of Transportation, Federal Aviation Administration, Order 1050.1E, *Environmental Impacts: Policies and Procedures,* June 8, 2004, Change 1, effective March 20, 2006.

3 Title 49 U.S. Code 47101(a)(1), January 3, 2007.

1.2 Background

Airport traffic control towers are normally located at airports with regularly scheduled flights.[4] FAA air traffic controllers working in ATCTs manage aircraft takeoffs and landings to and from an airport as well as the ground movement of aircraft on an airfield. ATCT air traffic controllers are responsible for expediting the flow of aircraft traffic both in the air and on the ground and for maintaining safe separations between aircraft as well as between aircraft and other obstacles to prevent collisions. To facilitate the management of the safe operation of aircraft, ATCTs are designed to provide air traffic controllers with a vantage point from which they have an unobstructed view of aircraft on the ground within the areas under air traffic control (referred to as "movement areas") and in the air in the vicinity of the airport. It is critical that air traffic controllers have unobstructed sight lines to all areas of the airport's runways and taxiways.

ATCT facilities typically include (1) a base building that provides an elevator lobby/stair vestibule to access the tower cab and administrative offices; (2) a tower shaft, the primary functional purpose of which is to accommodate elevator shafts, stairwells, and electrical/mechanical/plumbing conveyances; and (3) a tower cab positioned at an appropriate height to provide air traffic controllers with unobstructed views of the movement areas on the airfield and the surrounding airspace. Design considerations, such as the height of the tower cab and the number of air traffic controller positions to be accommodated in the tower cab, are based on the level of aircraft activity to be managed at the airport, airport size (area), and the airfield and airspace configuration.[5] FAA Order 6480.4A, *Airport Traffic Control Tower Siting Process,*[6] defines the methods to be used to site an ATCT based on balancing the considerations of an optimum tower height with location.

The existing Tower at SFO is 195 feet tall and the tower cab has approximately 525 square feet of work area for air traffic controllers. The base building, Tower shaft, and Tower cab of the SFO ATCT are structurally integrated with Terminal 2. The existing ATCT facilities accommodate office space previously used by Airport staff; FAA office space; weather tracking and monitoring equipment; heating, ventilation, and air condition (HVAC) equipment; electrical conduits and equipment; and the tower cab.

As described above, the purpose of an ATCT is to provide air traffic controllers with a vantage point from which they have an unobstructed view of aircraft on the ground within the movement areas of the airfield and in the air in the vicinity of the airport to maintain safe separation of aircraft. The functional needs of ATCT facilities (such as size and location) are based on the physical layout of an airport and the number of aircraft that air traffic controllers must manage at a given airport. In other words, the ATCT does not affect the level of aircraft activity at an airport, but the level of aircraft activity dictates the size and location needs for ATCT facilities. In 2010, the air traffic controllers working in the SFO ATCT managed approximately 387,250 operations and are forecast to manage 424,640 operations by 2018.[7] The number of air traffic controller positions needed to manage this forecast level of activity at SFO is the same as the existing number of positions. Historical and forecast operations between 2008 and 2018 are presented in **Table I-1**.

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4 A regularly scheduled flight, or an operation, refers to an aircraft landing or an aircraft takeoff.

5 U.S. Department of Transportation, Federal Aviation Administration, Air Traffic Organization, *Terminal Facilities Standard Designs A/E Project Manual*, July 27, 2009, pp. 94 and 95.

6 U.S. Department of Transportation, Federal Aviation Administration, Order 6480.4A, *Airport Traffic Control Tower Siting Process,* April 10, 2006.

7 Jacobs Consultancy, *Technical Memorandum, Aviation Demand Forecasts, San Francisco International Airport*, February 2010.

Table I-1

Historical and Forecast Operations, 2008–2018

Year	Itinerant Operations [1/]				Local Operations [2/]	Total Operations
	Air Carrier	Air Taxi and Commuter	General Aviation	Military		
Historical						
2008	284,350	85,470	15,453	2,697	134	388,104
2010	288,475	83,493	12,570	2,710	–	387,248
Forecast						
2013	294,240	85,800	12,500	3,000	200	395,740
2018	320,340	88,100	13,000	3,000	200	424,640

Notes:

1/ Itinerant operations refer to those operations by aircraft that take off from one airport and land at another airport.

2/ Local operations refer to those operations by aircraft that take off from and land at the same airport, such as for pilot training exercises. Local operations are not reported separately in data collected by Airport staff.

Sources: Jacobs Consultancy, *Technical Memorandum, Aviation Demand Forecasts, San Francisco International Airport*, February 2010, as approved by the FAA: Fernando Yáñez, Airport Planner, Federal Aviation Administration, in letter to Mr. James Ilnicki, Interim Planning Director, San Francisco International Airport, "FAA Approval of Aviation Activity Forecast: San Francisco International Airport," March 11, 2010 (2008 historical operations and forecast operations); and San Francisco International Airport, Airport Traffic Control Tower counts, January 2011 (2010 historical operations).

Prepared by: Ricondo & Associates, Inc., January 2011.

Terminal 2 was constructed in 1954 and included an ATCT, also constructed in the 1950s, on Level 8 of the terminal. In 1981, Terminal 2 was renovated and converted to an international terminal. During the renovation, space was reserved for construction of a new ATCT. Following the major terminal renovation, a new ATCT was constructed. The renovated Terminal 2 and new Tower were constructed around the original 1950s Tower, integrating the old Tower into the updated facilities. The 1950s Tower is currently accessed from Level 6 and is used as a ramp tower by United Airlines staff to manage the ground flow of aircraft in one of the aircraft gate areas, an area not controlled by FAA air traffic controllers.

The existing ATCT was commissioned over 25 years ago, in 1984, surpassing the 20-year design life for which such structures are typically designed. In 2000, a new international terminal opened at SFO and Terminal 2 was closed for renovations; however, the Tower remains operational. Renovation of Terminal 2 to convert it from an international aircraft terminal to a domestic terminal began in May 2008, and was completed in April 2011. The Terminal 2 renovation project received a Finding of No Significant Impact (FONSI) and Record of Decision (ROD) from the FAA as part of the Master Plan Improvements EA on November 5, 1998.

In 2005, while the CCSF was preparing to initiate the Terminal 2 renovation project, a seismic evaluation was conducted of the entire Terminal 2 building and the ATCT facilities, which are structurally integrated. The evaluation led to the determination that extensive upgrades to the building and ATCT facilities were required to meet current seismic, building, and fire code standards. The results of the seismic evaluation indicated that the ATCT facilities would most likely suffer serious and widespread damage during a major earthquake on the nearby San Andreas Fault.

This seismic damage may render the ATCT inoperable and potentially unsuitable for occupation.[8] It was further determined in the seismic evaluation that, although it would be possible to seismically upgrade the terminal building during the renovation project, no viable seismic retrofit options were available for the ATCT facilities. Any significant upgrades to the Tower would be cost prohibitive and functionally impractical because the ATCT could not be strengthened while fully operational.[9] In 2008, the FAA determined that changes to the Terminal 2 renovation program involving seismic upgrades (excluding the ATCT) and additional concessions area, office space, and other amenities in the connecting corridor between Terminals 1 and 2 were categorically excluded from review under NEPA, as specified in FAA Order 1050.1E.[10]

The FAA, in cooperation with the CCSF, completed, in October 2008, an evaluation of a number of potential relocation sites for the ATCT and recommended a site in the courtyard between Terminals 1 and 2 (referred to as Courtyard 2) as the optimal site for a relocated ATCT within the Airport's terminal complex. The evaluation of alternative relocation sites and selection of the optimal site are discussed in detail in Section 2.2.3 of this EA. The general project location is shown on **Exhibit I-1**, and a view of the terminal complex presented on **Exhibit I-2** illustrates the existing and proposed sites for the ATCT.

1.3 Need for and Purpose of the Proposed Action

Pursuant to NEPA and FAA Order 1050.1E, an EA must include a description of the purpose of a proposed action and why it is needed. Identification of the purpose and need for a proposed action provides the rationale and forms the foundation for identification of reasonable alternatives that can meet the purpose for the action and, therefore, address the need or problem. The need for the proposed action and the purpose of the proposed action that addresses the need are discussed in this section.

1.3.1 Need for the Proposed Action

The ATCT facilities at SFO were commissioned in 1984 and have exceeded the 20-year design life for which such structures are typically designed. The facilities are at the end of their useful lives and space to accommodate additional equipment is not available.

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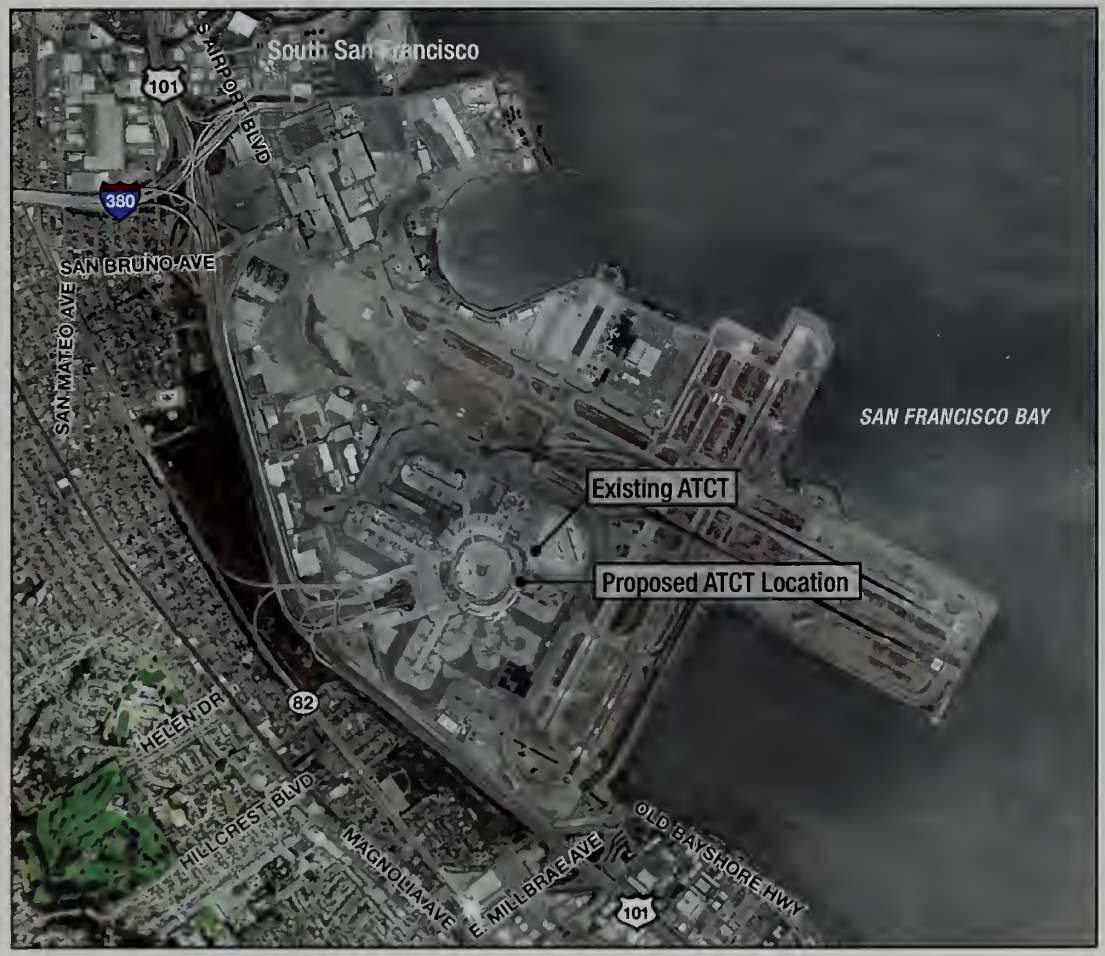
[8] Sunil Gupta, PhD, SE, President, OLMM Consulting Engineers, letter to Clonia Cautis, Gensler, "Feasibility of Seismic Strengthening of the Control Tower, San Francisco International Airport," August 28, 2006 (as appended to Lorig A. Wyllie, Jr., Senior Principal, Degenkolb, letter to Ray Quesada, Project Manager, Planning, Design, and Construction, San Francisco International Airport, "Structural Peer Review, Renovation of Terminal 2, San Francisco International Airport," October 24, 2006).

[9] U.S. Department of Transportation, Federal Aviation Administration, Los Angeles Terminal Engineering Center, *San Francisco International Airport, San Francisco, California, Airport Traffic Control Tower Site Survey FINAL Report*, October 2008.

[10] Camille Garibaldi, Environmental Protection Specialist, Federal Aviation Administration, letter to Danielle Rinsler, Planning Director, San Francisco International Airport, "Proposed Terminal 2/Boarding Area D Renovation Project," March 21, 2008.



Note: ATCT = Airport Traffic Control Tower

Sources: Google Map Pro December 2010; Map Resources 2009
Prepared by: Ricondo & Associates, Inc., February 2011.

Exhibit I-1

Not to Scale

north

Project Location Map

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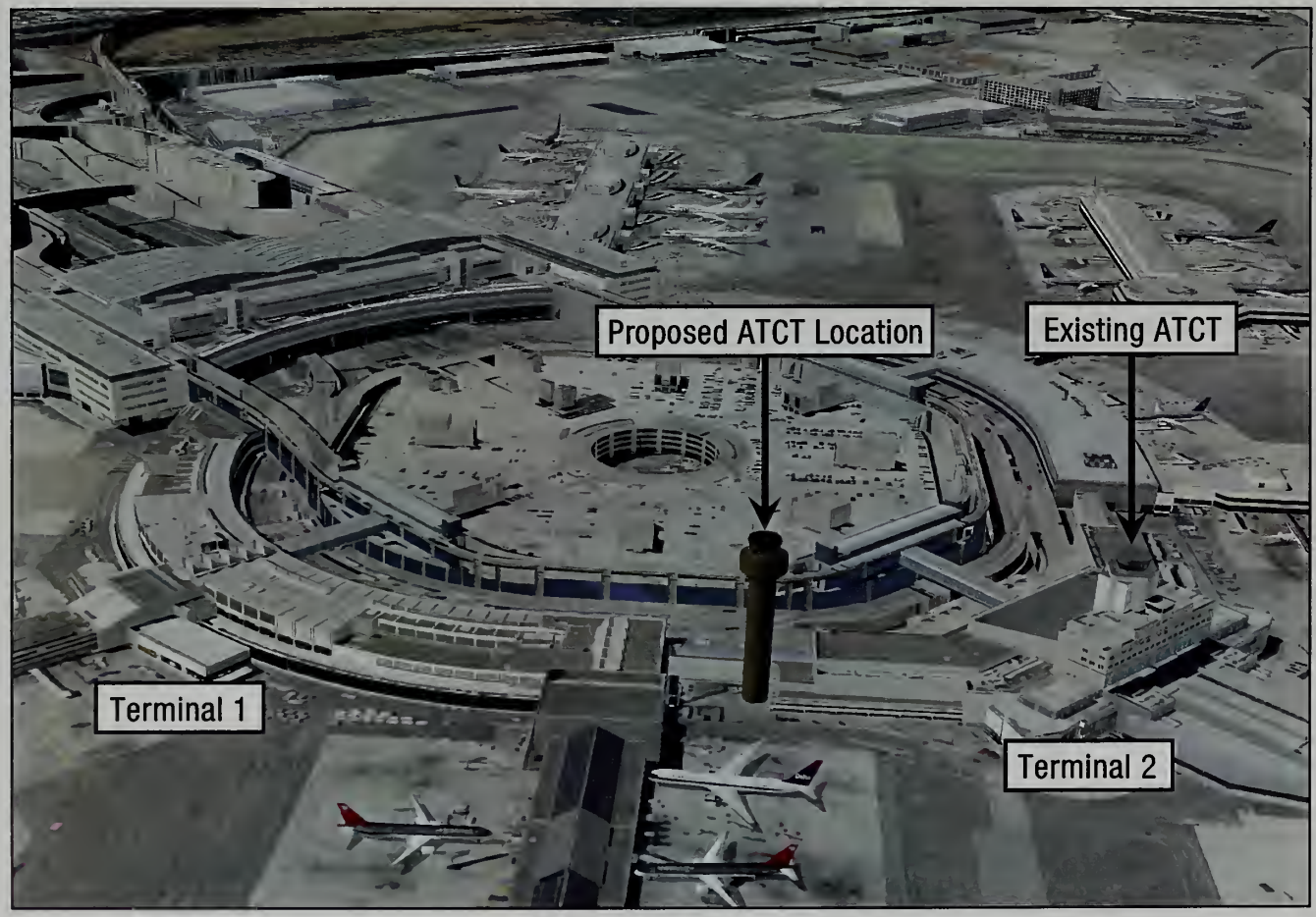

Note: ATCT = Airport Traffic Control Tower

Source: Anna Fantoni, Senior Aviation Planner, San Francisco International Airport, Bureau of Planning and Environmental Affairs, Presentation at the Airports Council International - North America Operations and Technical Affairs Conference, San Diego, California, "Domestic Terminal Redevelopment Plan, Airport Planning and Development Case Studies," March 18, 2009.
Prepared by: Ricondo & Associates, Inc., February 2011.

Exhibit I-2

Not to Scale

Terminal Complex

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A 2002 facility assessment conducted by the FAA at SFO to determine the scope and costs of projects required to support future equipment installations, seismic upgrades, and modernization of equipment identified several deficiencies in compliance with current codes and standards. The deficiencies in need of remediation include the need to modernize the ATCT facilities to accept future equipment, internal seismic upgrades, and some modernization of existing equipment. The FAA's 2002 seismic evaluation of facilities was limited to the interior spaces of the ATCT facilities (identifying needs such as anchoring cabinets to avoid injury during a seismic event) because the building is owned and maintained by the CCSF. A structural evaluation was outside the scope of the FAA's assessment.[11]

In 2005, the conclusions of a seismic evaluation of Terminal 2 and the ATCT facilities conducted on behalf of the CCSF identified that the terminal building was deficient with respect to seismic resistance.[12] It was determined that the terminal building and the ATCT facilities would require extensive seismic upgrades to meet current local seismic, building, and fire code standards, and that damage from a major earthquake could be so extensive that these facilities may be damaged beyond repair, which would render the ATCT facilities, which are essential to the operation of the Airport, inoperable.[13] In 2010, the CCSF relocated its personnel because of the Terminal 2 renovation project; however, the FAA continues to manage air traffic control operations from the existing ATCT facilities.

A major earthquake could render the ATCT facilities at SFO inoperable, thus disrupting air traffic control operations at the Airport. To ensure that air traffic control operations at SFO are not disrupted by a seismic event, the CCSF and FAA have identified the need to provide ATCT facilities that meet current seismic code standards. Furthermore, the CCSF and FAA have identified the need to be able to support future equipment installations, support modernized equipment, and meet local building and fire code standards. Any modifications to the existing ATCT facilities or relocation of the ATCT facilities must meet FAA siting criteria and visibility performance requirements, as defined in FAA Order 6480.4A.

1.3.2 Purpose of the Proposed Action

To address the needs identified in Section 1.3.1, the CCSF has identified the purpose of the Proposed Action as defined (i.e., the solution to the need) as the provision of ATCT facilities at SFO that:

- Meet local seismic, building, and fire code standards;
- Meet FAA siting criteria and visibility performance requirements;
- Accommodate future equipment installations; and
- Support the modernization of ATCT equipment.

While meeting the purpose for the relocated ATCT facilities, alternatives considered should also maximize the safety of air traffic operations and operational efficiency and minimize disruption to existing facilities and ongoing terminal redevelopment.

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[11] U.S. Department of Transportation, Federal Aviation Administration, Los Angeles Terminal Engineering Center, *San Francisco International Airport, San Francisco, California, Airport Traffic Control Tower Site Survey FINAL Report*, October 2008.

[12] *Ibid.*

[13] City and County of San Francisco, Planning Department, *Addendum to Environmental Impact Report for Courtyard 2 Projects,* July 30, 2010, p. 2.

1.4 Proposed Action

The FAA ATCT facilities, including the 195-foot-high Tower and the 525-square-foot Tower cab, currently located in Terminal 2, would be relocated to the proposed ATCT site in Courtyard 2, the area between Terminals 1 and 2. Specifically, the Proposed Action includes:

- **Relocation of the FAA ATCT**. The FAA ATCT functions currently located in ATCT facilities integrated with Terminal 2 would be relocated to a new ATCT that would be constructed at a site in Courtyard 2, the area between Terminals 1 and 2. The relocated Tower would be 228-feet high, and the Tower shaft would be 40 feet in diameter and topped by a 650-square-foot Tower cab. A three-story base building would provide space for FAA office and other administrative functions. At the departures level (Level 2), the ATCT structure would be integrated with improvements that are part of the Terminal 2 renovation program (i.e., concessions, restrooms, and pre- and post-security access corridors between Terminals 1 and 2). In total, the FAA functions in the existing ATCT occupy 30,900 square feet of space and would be relocated into 39,600 square feet of space in the Courtyard 2 location—representing an increase of 8,700 square feet for ATCT space. Parking for FAA staff is provided in Courtyard 2 and in the Domestic Terminal parking garage. Parking for FAA staff would be maintained in Courtyard 2 and additional spaces may be provided in an area that currently supports ground service equipment parking; some adjustments to the security fencing in Courtyard 2 may be required.
- **Demolition of the Terminal 2 office space and the FAA ATCT facilities and associated office and mechanical space**. For seismic safety and line-of-sight reasons, the CCSF would demolish the existing ATCT facilities and the Airport administrative office space located on Levels 4 through 11 of Terminal 2 when the relocated ATCT is operational.[14]

A sectional view of the proposed relocated Tower is shown on **Exhibit I-3**[15]. Floor plans of the relocated ATCT facilities (base building only) are provided in **Appendix A.** The Proposed Action would provide adequate ATCT facilities to accommodate and support currently forecast numbers of aircraft operations.

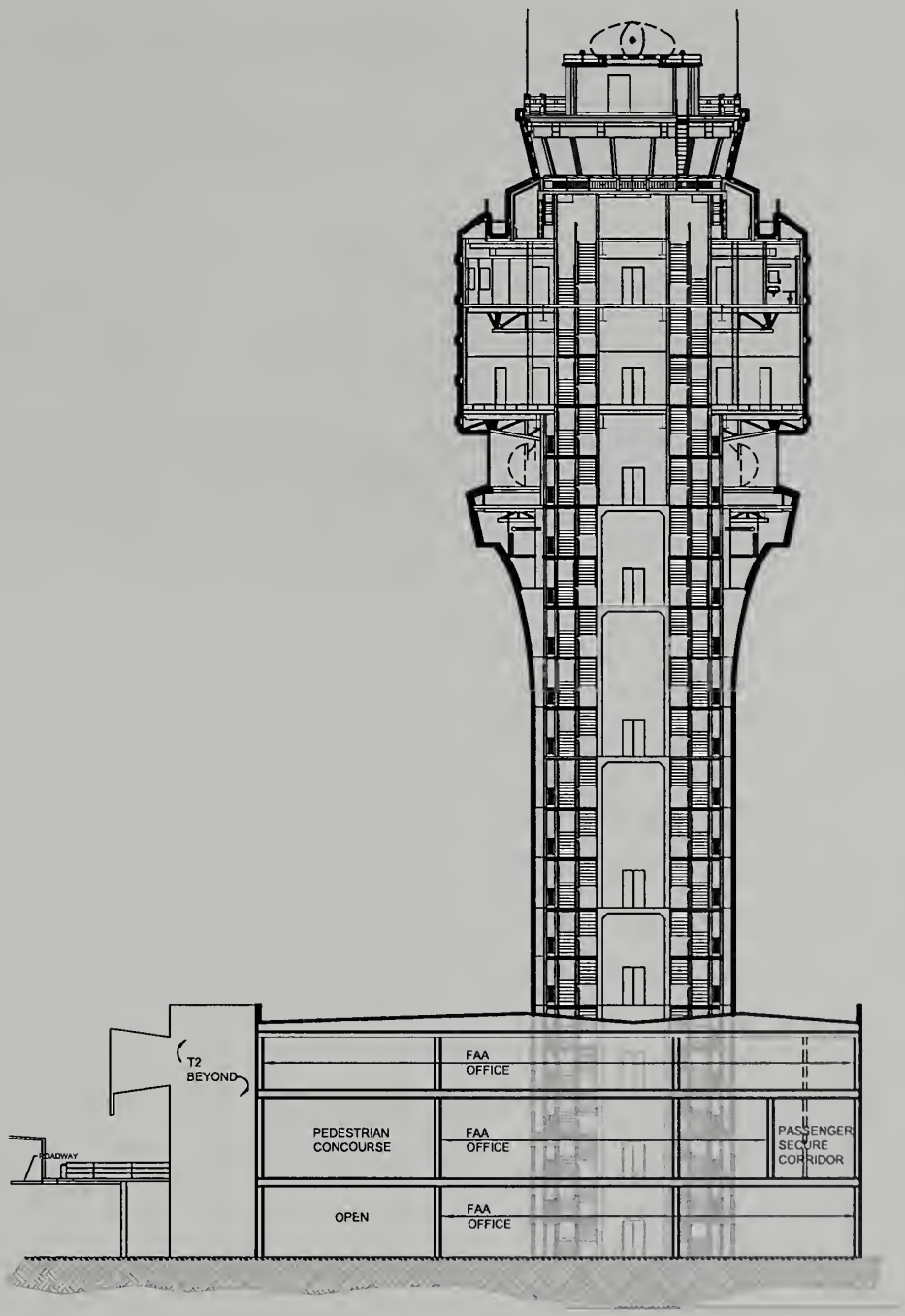
1.5 Requested Federal Action

The federal actions being requested of the FAA by the CCSF include:

- Unconditional approval of the Airport Layout Plan (ALP) for SFO depicting the proposed site for relocation of the ATCT facilities pursuant to 49 U.S.C. 40103(b), 44718, and 47107(a)(16); 14 Code of Federal Regulations (CFR) Part 77, *Objects Affecting Navigable Airspace;* and 14 CFR Part 157, *Notice of Construction, Alternation, Activation, and Deactivation of Airports.*

[14] During demolition of the existing Tower, Level 3 would be used for construction staging and would serve as a buffer between the construction activities on the levels above and the passenger terminal areas on the levels below.

[15] The design of the proposed ATCT has not been completed. Exhibit I-3 depicts a representational cross-section that may change as design progresses.



Notes:
FAA = Federal Aviation Administration

T2 = Terminal 2

Pedestrian Concourse and Passenger Secure Corridor are components of the Terminal 2 renovation project.
Representational section view subject to change as design of the ATCT progresses.

Source: San Francisco International Airport, Bureau of Design and Construction, May 2010.
Prepared by: Ricondo & Associates, Inc., January 2011.

Exhibit I-3

Airport Traffic Control Tower Section View

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- Determination under 49 U.S.C. 44502(b) that the Proposed Action is reasonably necessary for use in air commerce or in the interest of national defense.
- Continued close coordination with the CCSF and appropriate FAA program offices, as required, to ensure safety during construction pursuant to 14 CFR Part 139, *Certification of Airports,* under 49 U.S.C. 44706.

1.6 Timeframe of the Proposed Action

The CCSF anticipates construction of the relocated ATCT facilities to begin in September 2012 and to be completed in May 2014. From May 2014 through July 2015, the FAA would install systems, bring the systems online, and demonstrate operational readiness. The CCSF anticipates that the ATCT facility would be operational on July 31, 2015.

Demolition of the existing Tower and FAA-leased space (Levels 7 through 11) would commence when the relocated Tower becomes operational and would be completed by November 2015. Demolition of the Airport and FAA-leased administrative office space (Levels 4 through 6) and reconstruction of the Terminal 2 roof would be completed by the end of 2016.

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II. Alternatives

FAA Order 1050.1E sets forth FAA policies and procedures to be followed in assessing the environmental impacts of aviation-related projects in compliance with NEPA and the implementing regulations issued by the Council on Environmental Quality (CEQ) (Title 40 CFR Parts 1500-1508). This Order requires a thorough and objective assessment of the Proposed Action, the No Action alternative, and all "reasonable" alternatives that would achieve the stated purpose and need for the Proposed Action. The alternatives analysis presented in this chapter of the EA is consistent with the requirements of FAA Order 1050.1E.

The process followed to identify the range of initial alternatives to be considered and the screening process used to determine which alternatives would reasonably satisfy the purpose of and need for the Proposed Action are described in this chapter. Those alternatives that would satisfy the purpose and need for the Proposed Action were carried forward for analysis of environmental consequences. Lists of applicable federal laws and regulations considered during the analysis are provided at the end of this chapter.

2.1 Identification of Initial Alternatives

Two main categories of alternatives—upgrading the existing ATCT facilities and relocating the ATCT facilities—were identified as the range of alternatives potentially able to meet the purpose and need defined for the Proposed Action, which would provide ATCT facilities that would (1) meet local seismic, building, and fire code standards; (2) meet FAA ATCT siting criteria and visibility performance requirements; (3) accommodate future equipment installations; and (4) support the modernization of ATCT equipment. Means of providing air traffic control services that would meet FAA guidance in some manner other than from an ATCT were not considered a viable alternative because air traffic controllers must have unobstructed views of the aircraft movement areas on the airfield; however, this analysis does evaluate the FAA's back-up procedure for the provision of ATCT services in the event that an ATCT is out of commission as an alternative.

Therefore, the alternatives considered in this EA include:

- **No Action**. Under the No Action alternative, ATCT operations would continue to be conducted from the existing ATCT facilities at Terminal 2.
- **Seismic Strengthening of the Existing ATCT Facilities**. An alternative to upgrade the existing ATCT facilities was identified. The FAA analyzed the feasibility of seismic strengthening of the ATCT in August 2006.[1] The conclusion of the analysis was that steel bracing would be required in the Tower and the Tower cab to strengthen the Tower, which would cause significant disruption during construction and create line-of-sight obstructions for the air traffic controllers following construction. Furthermore, given the magnitude of construction required to strengthen and rehabilitate the existing Tower and the need to test the ATCT facilities following construction, the FAA would need to construct a temporary Tower and relocate air traffic control operations to the temporary Tower for a period of 27 to 36 months.
- **Provision of ATCT Services from the Northern California TRACON**. In the event that an ATCT is out of commission, the back-up procedure is to provide ATCT services from the Terminal Radar Approach Control Center (TRACON). Air traffic controllers at a TRACON

[1] Sunil Gupta, PhD, SE, President, OLMM Consulting Engineers, letter to Clonia Cautis, Gensler, "Feasibility of Seismic Strengthening of the Control Tower, San Francisco International Airport," August 28, 2006.

manage the airspace surrounding the airspace under control of the ATCT controllers. The TRACON facility managing the airspace in the San Francisco area is the Northern California TRACON located in Mather, California. Therefore, this alternative evaluates the provision of ATCT services from the Northern California TRACON, an off-Airport location.

- **Relocation of the ATCT Facilities**. Relocation of the existing ATCT facilities to a new on-Airport location was evaluated by the FAA. The results of the evaluation, which included extensive participation by the CCSF, are documented in the *Airport Traffic Control Tower Site Survey FINAL Report*[2] (ATCT Site Survey). The ATCT Site Survey describes the survey process, evaluation criteria for the proposed Tower site, an overview of all potential sites considered, the evaluation of the primary site options, and the final conclusions and recommendations. The ATCT Site Survey was conducted to determine the optimum location and height for new ATCT facilities at SFO primarily based on FAA Order 6480.4A, *Airport Traffic Control Tower Siting Process*,[3] and FAA Order 6480.7D, *Airport Traffic Control Tower and Terminal Radar Approach Control Facility Design Guidelines*.[4] A total of 21 potential ATCT sites were identified by the FAA and the CCSF. The potential sites for relocation of the ATCT facilities at SFO are summarized in **Table II-1** and shown on **Exhibit II-1**.

2.2 Evaluation of Alternatives

The ability of each alternative considered to meet the stated purpose and need for the Proposed Action is documented in this section, along with a conclusion regarding whether or not each alternative would be retained for further analysis of potential environmental consequences in this EA.

2.2.1 No Action

The existing ATCT facilities (without upgrades) do not meet local seismic, building, and fire code standards; would not accommodate future FAA equipment installations; and would not support the modernization of ATCT equipment. The design of the Tower, constructed in the early 1980s, does not meet current local seismic design standards. A seismic analysis indicated that the Tower has major seismic deficiencies and would most likely sustain serious, potentially irreparable damage during a major earthquake on the nearby San Andreas Fault,[5] which has a very high probability of producing a major earthquake based on a 2003 study by the U.S. Geological Survey.[6] Seismic damage could render the ATCT facilities, which are essential to the operation of the Airport, inoperable and potentially unsuitable to be occupied.[7] If this were to occur, aircraft operations would be severely curtailed, if not completely stopped, at the Airport.

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2 U.S. Department of Transportation, Federal Aviation Administration, Los Angeles Terminal Engineering Center, *San Francisco International Airport, San Francisco, California, Airport Traffic Control Tower Site Study, FINAL Report*, October 2008.

3 U.S. Department of Transportation, Federal Aviation Administration, Order 6480.4A, *Airport Traffic Control Tower Siting Process,* April 10, 2006.

4 U.S. Department of Transportation, Federal Aviation Administration Order, 6480.7D, *Airport Traffic Control Tower and Terminal Radar Approach Control Facility Design Guidelines,* August 11, 2004 (subsequently updated by U.S. Department of Transportation, Federal Aviation Administration, Order JO 6480.7E, *Airport Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON) Design Policy,* January 14, 2009).

5 Sunil Gupta, PhD, SE, President, OLMM Consulting Engineers, letter to Clonia Cautis, Gensler, "Feasibility of Seismic Strengthening of the Control Tower, San Francisco International Airport," August 28, 2006.

6 *Ibid.*

7 *Ibid.*

Table II-1

Potential Locations for Relocating Airport Traffic Control Tower Facilities

Site Number	Controller Eye Height (feet above MSL) [1/]	General Location Description
Site 1	396	Northern portion of the Airport
Site 2	293	Northern portion of the Airport
Site 3	– [2/]	Terminal complex
Site 3A	184	Terminal complex (site identified to mitigate the visual obstructions identified at Site 3)
Site 4	– [3/]	Terminal complex
Site 4A	218	Terminal complex (site identified to mitigate the visual obstructions identified at Site 4)
Site 5	– [2/]	Terminal complex
Site 6	– [2/]	Terminal complex
Site 6A	– [2/]	Terminal complex (site identified to mitigate the visual obstructions identified at Site 6)
Site 6B	284	Terminal complex (site identified to mitigate the visual obstructions identified at Site 6A)
Site 7	393 [2/]	Terminal complex
Site 8	375 [2/]	Terminal complex
Site 9	412	Southwestern portion of the Airport, along the terminal entrance roadways
Site 10	>400	Southwestern portion of the Airport, along the terminal entrance roadways
Site 10A	397	Southwestern portion of the Airport, in a parking area along the terminal entrance roadways (site has better access to public transportation than Site 10)
Site 11	485	Western portion of the Airport
Site 12	– [3/]	Terminal complex
Site 13	220	Terminal complex, to be integrated with the redeveloped Terminal 2
Site 13A	216	Terminal complex (site identified as an alternative to Site 4A)
Site 14	– [3/]	Terminal complex, center of the parking garage
Site 15	207	Terminal complex

Notes:
MSL = Mean sea level
– = Not defined
1/ Controller eye height is estimated as 5 feet above the Tower cab floor, and is identified as the minimum point from which a controller could view all aircraft approaches and aircraft ground movements from that potential Tower site.
2/ Visual obstructions from this site were unable to be mitigated, so air traffic controller eye height was not established or the identified controller eye height failed visibility tests.
3/ Controller eye height was not established for this location.

Source: U.S. Department of Transportation, Federal Aviation Administration, Los Angeles Terminal Engineering Center, *San Francisco International Airport, San Francisco, California, Airport Traffic Control Tower Site Study, FINAL Report*, October 2008
Prepared by: Ricondo & Associates, Inc., January 2011.

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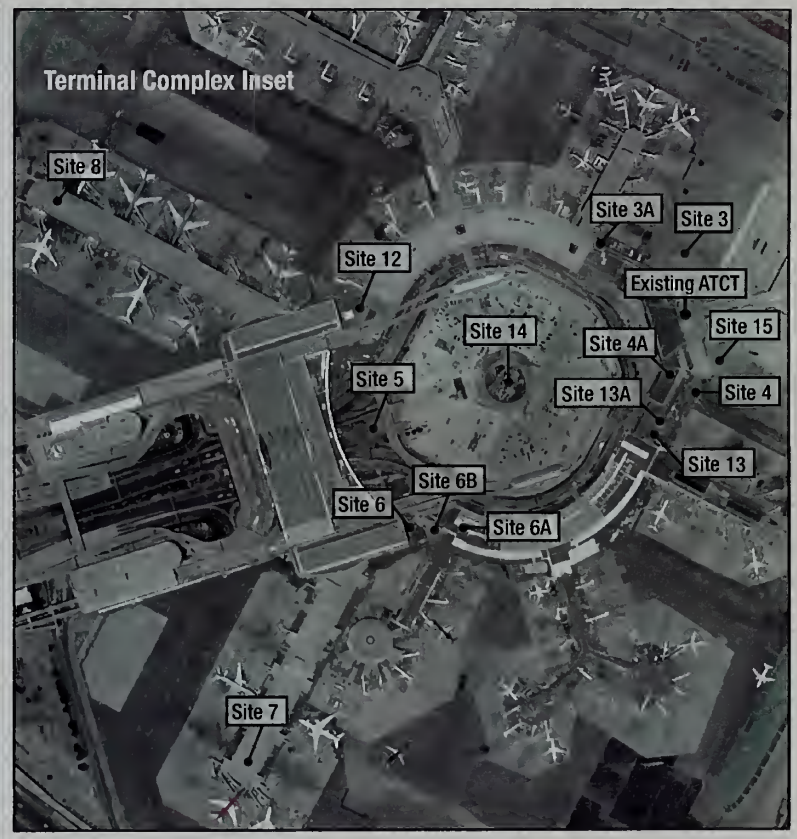

Notes: ATCT = Airport Traffic Control Tower
See Table II-I for additional information on site locations

Sources: U S Department of Transportation, Federal Aviation Administration, Los Angeles Terminal Engineering Center, *San Francisco International Airport, San Francisco, California, Airport Traffic Control Tower Site Study, FINAL Report*, October 2008.
Prepared by: Ricondo & Associates, Inc., February 2011.

Exhibit II-1

Not to Scale

north

Potential Sites for Relocating the ATCT Facilities

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The No Action alternative would not meet the purpose and need for ensuring that ATCT operations would not be disrupted by a seismic event or for allowing the FAA to install new equipment and modernize the facilities. Although the No Action alternative does not meet the stated purpose and need for the Proposed Action, Title 40 CFR 1502.14(d) requires evaluation of the No Action alternative compared to the Proposed Action as a basis for determining the extent of potential impacts. Thus, the No Action alternative was retained for further analysis in this EA.

2.2.2 Seismic Strengthening of the Existing ATCT Facilities

The viability of strengthening the existing ATCT facilities to meet seismic design standards was evaluated. Major strengthening of the Tower would be required to meet current local seismic design requirements. Strategies to improve the Tower's seismic performance would also require strengthening the Terminal 2 structure (because the ATCT is integrated with Terminal 2), which would affect the construction cost and duration of any improvements. Seismic strengthening of the Tower would require the addition of steel bracing in the Tower cab, which would obstruct air traffic controller views of the surrounding area. Seismic strengthening would also require extensive structural work in the Tower and in Terminal 2, involving the demolition and reconstruction of exterior and interior finishes to add bracing and improve structural support.

Construction of these improvements is estimated to require between 18 and 24 months, following an additional 9 to 12 months for testing of the ATCT facilities before they become operational. The FAA would have to build a temporary Tower before construction could begin and then relocate air traffic control functions to the temporary Tower during the 27 to 36 month construction and testing period.[8] Preliminary costs associated with the seismic retrofit construction and associated relocation of ATCT functions to a temporary facility were estimated at $40 million.[9]

Although renovation associated with seismic strengthening of the existing ATCT facilities could include upgrades to the facilities to meet local building and fire code standards, this alternative would not achieve the purpose and need to provide a facility that could accommodate future FAA equipment installations or support the modernization of ATCT equipment. Additionally, improvements to the ATCT needed to meet seismic design requirements would include steel bracing in the Tower cab, which would create line-of-sight obstructions for air traffic controllers, and would not meet FAA visibility performance requirements. Therefore, this alternative would not meet the purpose and need for the Proposed Action and was, therefore, not retained for further analysis in this EA.

2.2.3 Provision of ATCT Services from the Northern California TRACON

The provision of ATCT services at SFO from the Northern California TRACON facility in Mather, California, was evaluated. Given the need to meet FAA visibility performance requirements, which includes the need for controllers to have an unobstructed view of aircraft on the ground within the movement areas at SFO, controllers located in Mather, over 115 miles from SFO, would not have an unobstructed view of the SFO movement areas. While the TRACON controllers could manage operations of airborne aircraft in the immediate vicinity of SFO as a backup if the ATCT equipment at SFO is not functional, they would not be able to manage aircraft movements on the ground without

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[8] The original 1954 ATCT could not be used as a temporary ATCT because it is not big enough to accommodate the necessary air traffic control positions and it lost more than half of its 360 degree view with construction of the 1984 Tower; thus, it does not have unobstructed views of all aircraft movement areas on the airfield.

[9] Sunil Gupta, PhD, SE, President, OLMM Consulting Engineers, letter to Clonia Cautis, Gensler, "Feasibility of Seismic Strengthening of the Control Tower, San Francisco International Airport," August 28, 2006.

visual contact. Therefore, this alternative would not meet the purpose and need for the Proposed Action and was, therefore, not retained for further analysis in this EA.

2.2.4 Relocation of the ATCT Facilities

As noted in Section 2.1, the FAA and the CCSF undertook an ATCT Site Survey, in which 21 potential sites for a new Tower were identified and evaluated (see Table II-1). The evaluation of the potential relocation sites is summarized in this section and was guided by criteria defined by the FAA to conduct an ATCT siting process, as documented in FAA Order 6480.4A.[10] The evaluation process included the following steps:

- **Initial Screening**. A preliminary assessment was conducted to evaluate each site based on three criteria (a preliminary assessment of visual obstructions, operational issues, and constructibility);
- **Secondary Screening**. A more detailed evaluation of sites identified as preliminarily viable (those carried forward from the initial screening assessment) was conducted, with evaluation criteria based on an FAA analysis of the safety of air traffic operations and SFO constructibility considerations; and
- **Estimated Preliminary Construction Costs**. Preliminary construction costs were estimated for the alternative sites that were carried forward from the secondary screening assessment.

Each of the potential alternatives sites is located within the already developed terminal complex at the Airport, so environmental impacts were not presumed to be a differentiator among relocation sites. Therefore, the screening of potential sites for the relocated Tower based on environmental factors was not included in this evaluation.

Each step in the alternatives evaluation process is summarized below, followed by a summary of the selection of the preferred site.

2.2.4.1 Initial Screening: Preliminary Assessment of Relocation Sites

A preliminary assessment of each potential ATCT relocation site was conducted to identify those sites considered to be viable. The criteria used to evaluate the viability of each site included:

- **Visual Obstructions**. Preliminary identification of obstructions from the potential relocation sites to the aircraft movement areas, including obstructions such as those presented by existing and planned facilities, including the existing ATCT.
- **Operational Issues**. Consideration of ATCT orientation to avoid glare from the sun, potential interference with aircraft departure or approach procedures, visibility of aircraft movement areas, lighting, and weather phenomena that impair visibility.
- **Constructibility Issues.** Consideration of compatibility with existing facilities and utilities, Airport development plans, and the cost for a new Tower based on a height considered to be excessively tall (driven by the need to provide adequate views of the airfield).

Of the preliminary 21 alternatives sites, 5 sites were identified as potentially viable: Sites 3A, 4A, 6B, 13, and 13A. No operational or constructibility issues were found at these five sites, and it was determined that the minor visual obstruction issues identified for four of the five sites could be mitigated. Therefore, these 5 sites were carried forward to the secondary screening analysis, while the remaining 16 sites were determined not to be viable and were eliminated from further consideration. The findings of this preliminary viability assessment are presented in **Table II-2**.

[10] U.S. Department of Transportation, Federal Aviation Administration, Order 6480.4A, *Airport Traffic Control Tower Siting Process*, April 10, 2006.

Table II-2 (1 of 4)

Initial Screening: Preliminary Assessment of Relocation Sites

Site Number	Summary of Issues [1/]	Preliminary Assessment of Site Viability [2/]
1	**Visual Obstructions:** • None **Operational Issues:** • Weather related: Airport area is often shrouded in low clouds • Concerns with controllers' ability to discriminate among objects on the airfield • Potential conflict with aircraft operations **Constructibility Issues:** • Excessive Tower height	Not viable Site determined to not be viable because of excessive Tower height and operational issues
2	**Visual Obstructions:** • None **Operational Issues:** • Weather related: Airport area is often shrouded in low clouds • Terminal building lights may cause difficulty viewing ramp area • Significant change in controllers' perspective of airfield • Potential conflict with aircraft operations **Constructibility Issues:** • None	Not viable Site determined to not be viable because of operational issues
3	**Visual Obstructions:** • Visual obstruction of aircraft movement area **Operational Issues:** • None **Constructibility Issues:** • None	Not viable Attempts to mitigate visual obstruction were unsuccessful; Site 3A was identified to mitigate the visual obstruction associated with Site 3
3A	**Visual Obstructions:** • None **Operational Issues:** • None **Constructibility Issues:** • None	Viable Site 3A was carried forward for detailed assessment
4	**Visual Obstructions:** • View of airfield from existing ATCT would be obstructed during construction of an ATCT at this site **Operational Issues:** • None **Constructibility Issues:** • None	Not viable Site 4A was identified to mitigate the visual obstruction associated with Site 4
4A	**Visual Obstructions:** • Existing ATCT would obstruct view of a portion of Taxiway A from this site until existing ATCT is demolished **Operational Issues:** • None **Constructibility Issues:** • None	Viable Potential ability to mitigate visual obstruction was identified; Site 4A was carried forward for detailed assessment

Table II-2 (2 of 4)

Initial Screening: Preliminary Assessment of Relocation Sites

Site Number	Summary of Issues [1/]	Preliminary Assessment of Site Viability [2/]
5	**Visual Obstructions:** • Existing ATCT would obstruct views from an ATCT at this site to a critical airfield movement area **Operational Issues:** • Failed visibility tests **Constructibility Issues:** • Site is at the main entrance and exit to the parking garage	Not viable Site determined to not be viable because of visual, operational, and constructibility issues
6	**Visual Obstructions:** • Visual obstruction of an aircraft movement area **Operational Issues:** • None **Constructibility Issues:** • None	Not viable Sites 6A and 6B were identified in an attempt to mitigate the visual obstruction issue
6A	**Visual Obstructions:** • Visual obstruction of an aircraft movement area **Operational Issues:** • None **Constructibility Issues:** • None	Not viable Site did not eliminate visual obstruction issue identified for Site 6 and was determined to not be viable
6B	**Visual Obstructions:** • Minor visual obstructions **Operational Issues:** • None **Constructibility Issues:** • None	Viable Mitigated visual obstruction identified for Site 6 and remaining obstructions considered low risk; Site 6B was carried forward for detailed assessment
7	**Visual Obstructions:** • None **Operational Issues:** • Would not provide visibility of all aircraft movement areas **Constructibility Issues:** • Excessive Tower height • Construction of top of boarding area may result in temporary loss of some gates and alteration of boarding area for structural support • Complex ramp operation during construction	Not viable Site determined to not be viable because of operational and constructibility issues
8	**Visual Obstructions:** • None **Operational Issues:** • Would not provide visibility of all aircraft movement areas **Constructibility Issues:** • Excessive Tower height • Construction of top of boarding area may result in temporary loss of some gates and alteration of boarding area for structural support • Complex ramp operation during construction	Not viable Site determined to not be viable because of operational and constructibility issues

Table II-2 (3 of 4)

Initial Screening: Preliminary Assessment of Relocation Sites

Site Number	Summary of Issues [1/]	Preliminary Assessment of Site Viability [2/]
9	**Visual Obstructions:** • None **Operational Issues:** • Tower height could penetrate low clouds, which would present visibility issues • Site too distant from runways **Constructibility Issues:** • Excessive Tower height	Not viable Site determined to not be viable because of operational and constructibility issues
10	**Visual Obstructions:** • None **Operational Issues:** • Tower height could penetrate low clouds, which would present visibility issues • Site too distant from runways **Constructibility Issues:** • Excessive Tower height	Not viable Site determined to not be viable because of operational and constructibility issues Site 10A was identified as an alternative to provide better access to public transportation from the site
10A	**Visual Obstructions:** • None **Operational Issues:** • Tower height could penetrate low clouds, which would present visibility issues • Site too distant from runways **Constructibility Issues:** • Excessive Tower height	Not viable Site determined to not be viable because of operational and constructibility issues
11	**Visual Obstructions:** • None **Operational Issues:** • Tower height could penetrate low clouds, which would present visibility issues • Site too distant from runways • Potential conflict with protected airspace areas required to provide for safe aircraft operations **Constructibility Issues:** • Excessive tower height	Not viable Site determined to not be viable because of operational and constructibility issues
12	**Visual Obstructions:** • None **Operational Issues:** • None **Constructibility Issues:** • Extensive utilities under site	Not viable Site determined to not be viable because of constructibility issues

Table II-2 (4 of 4)

Initial Screening: Preliminary Assessment of Relocation Sites

Site Number	Summary of Issues [1/]	Preliminary Assessment of Site Viability [2/]
13	**Visual Obstructions:** • Existing ATCT would obstruct view of a portion of Taxiway B **Operational Issues:** • None **Constructibility Issues:** • None	Viable Site determined to be potentially viable as visual obstruction issue can be mitigated by demolishing the existing ATCT after the new ATCT is operational; Site 13 was carried forward for detailed assessment
13A	**Visual Obstructions:** • Existing ATCT would obstruct view of Taxiway T **Operational Issues:** • None **Constructibility Issues:** • None	Viable Site identified as an alternative to Site 4A, visual obstruction issue can be mitigated by demolishing the existing ATCT after the new ATCT is operational; Site 13A was carried forward for detailed assessment
14	**Visual Obstructions:** • None **Operational Issues:** • None **Constructibility Issues:** • Conflict with existing taxicab staging area • Conflict with existing utility corridor	Not viable Site determined to not be viable because of constructibility issues
15	**Visual Obstructions:** • Visual obstruction of an aircraft movement area **Operational Issues:** • None **Constructibility Issues:** • None	Not viable Site determined to not be viable because of visual obstruction issues

Notes:

1/ The viability of each site was assessed based on preliminary visual obstruction, operational, and constructibility issues.

2/ Determination of the viability of each site is documented in the ATCT Site Survey (see source below). Those sites determined to be "viable" were carried forward for detailed assessment. Not viable sites are highlighted in grey colored boxes.

Source: U.S. Department of Transportation, Federal Aviation Administration, Los Angeles Terminal Engineering Center, *San Francisco International Airport, San Francisco, California, Airport Traffic Control Tower Site Study, FINAL Report,* October 2008.

Prepared by: Ricondo & Associates, Inc., April 2011.

2.2.4.2 Secondary Screening: Detailed Assessment of Viable Relocation Sites

The five sites identified as preliminarily viable by the FAA were carried forward to a secondary screening analysis. The FAA analyzed the remaining sites with respect to the safety of air traffic operations; the results are documented in the ATCT Site Survey. Concurrently, the CCSF further assessed the constructibility of each of the five remaining sites. The results of this secondary screening assessment are presented in **Table II-3**; the criteria considered in the FAA's analysis of the safety of air traffic operations for each site carried forward from the initial screening analysis are described below.

- **Visibility Performance Requirements**
  - *Unobstructed View*—Controllers should have an unobstructed view of all controlled movement areas of the Airport, including all runways and any other landing areas, taxiways, and air traffic in the vicinity of the Airport. Existing structures as well as the existing ATCT were considered.
  - *Object Discrimination*—Controllers should have a view of the airfield that supports requirements for object visibility from the Tower cab, measured both by the probability of detecting and the probability of recognizing an object on the airfield surface.
  - *Line of Sight Angle of Incidence*—Controllers should have a view of the airfield that meets the requirements for viewing objects at acceptable angles on the airfield surface.
- **Federal Laws, Regulations, Orders, and Standards that Pertain to the Siting of an ATCT**
  - *U.S. Standard for Terminal Instrument Procedures (TERPS)*—The ATCT should be sited such that it does not degrade a current or planned terminal instrument procedure. A terminal instrument procedure is a predefined set of guidance instructions that define a route for a pilot to follow within the airspace area supporting arrivals and departures to and from an airport.
  - *Compatibility with Navigable Airspace and Airport Design Standards*—The ATCT site should not interfere with operation of an airport, including areas designated to support safe aircraft operations and areas defined for future development on the ALP, the scaled drawings of the airport that depict existing and future facilities and property necessary for operation and development of the airport.[11]
  - *Communications, Navigation, and Surveillance Equipment*—The ATCT site should not be positioned such that it degrades or affects the performance of existing or planned facilities and/or equipment, unless unavoidable.

During the secondary screening assessment, constructibility issues at Sites 3A and 4A were identified by Airport staff, resulting in a determination that those sites were not viable to support the relocation of ATCT facilities. Although some low risk hazards were identified at Sites 6B, 13, and 13A during the safety of air traffic operations analysis, means to mitigate those hazards were identified. All three sites were determined to meet the FAA's safety of air traffic operations criteria and were carried forward to a preliminary construction cost analysis.

[11] 14 Code of Federal Regulations Part 77, *Objects Affecting Navigable Airspace*, January 1, 2010 edition, and U.S. Department of Transportation, Federal Aviation Administration Advisory Circular 150/5300-13 through Change 16, *Airport Design*, January 3, 2011.

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Table II-3

Secondary Screening: Detailed Assessment of Viable

Evaluation Criteria	S	Site 13A
Safety of Air Traffic Operations		
Tower Height	196 feet above gr	228 feet above ground level
Visibility Performance Requirements		
– Unobstructed View	Temporary Impact - Existing ATCT woul portions of two runv taxiways; procedure (including removal operation of a new mitigate impact of o	views to a o a nts T upon dentified to his site.	Temporary Impact - Mitigated (1) Existing ATCT would obstruct views to a runway-taxiway intersection and portions of two taxiways; commitments (including removal of existing ATCT upon operation of a new Tower) were identified to mitigate impact of obstruction at this site. (2) Concourse facilities would obstruct views to gates and a portion of a taxiway; procedures and equipment identified to mitigate impact of obstruction at this site.
– Object Discrimination (both probability of detection and probability of recognition parameters)	Passed		Passed
– Line of Sight Angle of Incidence Parameters	Passed		Passed
Federal Laws, Regulations, Orders, and Standards			
– Effects on TERPS	None	one impact.	None
– Compatibility with Navigable Airspace and Airport Design Standards	Mitigated Obstruction lighting required to provide pilots.		Compatible
– Effects on Communication, Navigation, and Surveillance Equipment	None		None
Constructibility Issues	Yes Construction at this secure passenger c Emergency Operati		No
Findings	Eliminated Site was eliminated constructibility issue	lysis ards, ed.	Carried Forward Safety of air traffic operations analysis identified low to medium risk hazards, which would be able to be mitigated

Notes:
TERPS = *U.S. Standard for Terminal Instrument Procedures*
1/ The proposed Tower height at Site 6B was reduced at this reduced height (originally 293 feet above ground level).

Sources: U.S. Department of Transportation, Federal Aviation Administr ety of air traffic operations analysis); and City and County of San Francisco, Planning Department, 2008 (constructibility issues).
Prepared by: Ricondo & Associates, Inc., January 2011.

Table II-3

Secondary Screening: Detailed Assessment of Viable Relocation Sites (Safety of Air Traffic Operations Analysis and Constructibility Issues)

Evaluation Criteria	Site 3A	Site 4A	Site 6B [1/]	Site 13	Site 13A
Safety of Air Traffic Operations					
Tower Height	196 feet above ground level	230 feet above ground level	274 feet above ground level	232 feet above ground level	228 feet above ground level
Visibility Performance Requirements					
– Unobstructed View	Temporary Impact - Mitigated Existing ATCT would obstruct views of portions of two runways and several taxiways; procedures and commitments (including removal of existing ATCT upon operation of a new Tower) were identified to mitigate impact of obstruction at this site.	Temporary Impact – Mitigated Existing ATCT would obstruct view of portion of one taxiway; procedures and commitments (including removal of existing ATCT upon operation of a new Tower) were identified to mitigate impact of obstruction at this site.	Temporary Impact – Mitigated Existing ATCT would obstruct views of portions of two taxiways and one runway; commitments (including the removal of existing ATCT upon operation of a new Tower) were identified to mitigate impact of obstruction at this site.	Mitigated (1) Existing ATCT would obstruct views to a runway-taxiway intersection and to a portion of one taxiway; commitments (including removal of existing ATCT upon operation of a new Tower) were identified to mitigate impact of obstruction at this site. (2) Concourse facilities would obstruct views to gates and a portion of a taxiway; procedures and equipment identified to mitigate impact of obstruction at this site.	Temporary Impact - Mitigated (1) Existing ATCT would obstruct views to a runway-taxiway intersection and portions of two taxiways; commitments (including removal of existing ATCT upon operation of a new Tower) were identified to mitigate impact of obstruction at this site. (2) Concourse facilities would obstruct views to gates and a portion of a taxiway; procedures and equipment identified to mitigate impact of obstruction at this site.
– Object Discrimination (both probability of detection and probability of recognition parameters)	Passed	Passed	Did Not Pass All Parameters Site passed probability of detecting an object on the Airport surface at seven of the eight identified critical locations and the probability of recognizing an object on the Airport surface at six of the eight identified critical locations.	Passed	Passed
– Line of Sight Angle of Incidence Parameters	Passed	Passed	Passed	Passed	Passed
Federal Laws, Regulations, Orders, and Standards					
– Effects on TERPS	None	Mitigated Change to one arrival procedure was identified to mitigate impact.	Mitigated Changes to arrival procedures for two runways were identified to mitigate impact.	Mitigated Changes to arrival procedures for one runway were identified to mitigate impact.	None
– Compatibility with Navigable Airspace and Airport Design Standards	Mitigated Obstruction lighting of Tower would be required to provide visual identification to pilots.	Mitigated Obstruction lighting of Tower would be required to provide visual identification to pilots.	Mitigated Obstruction lighting of Tower would be required to provide visual identification to pilots.	Compatible	Compatible
– Effects on Communication, Navigation, and Surveillance Equipment	None	None	None	None	None
Constructibility Issues	Yes Construction at this site would affect a secure passenger corridor and the Airport's Emergency Operations Center.	Yes Construction at this site would conflict with renovation of the south wing of Terminal 2.	No	No	No
Findings	Eliminated Site was eliminated because of constructibility issues.	Eliminated Site was eliminated because of constructibility issues.	Carried Forward Safety of air traffic operations analysis identified low risk hazards, which would be able to be mitigated, and identified the inability to pass all parameters of the object discrimination test.	Carried Forward Safety of air traffic operations analysis identified low to medium risk hazards, which would be able to be mitigated.	Carried Forward Safety of air traffic operations analysis identified low to medium risk hazards, which would be able to be mitigated.

Notes:
TERPS = *U.S. Standard for Terminal Instrument Procedures*
1/ The proposed Tower height at Site 6B was reduced to 274 feet above ground level because of a 5-foot penetration of the TERPS surface. The FAA verified that no adverse line-of-sight effects would occur at this reduced height (originally 293 feet above ground level).

Sources: U.S. Department of Transportation, Federal Aviation Administration, Los Angeles Terminal Engineering Center, *San Francisco International Airport, San Francisco, California, Airport Traffic Control Tower Site Study, FINAL Report,* October 2008 (safety of air traffic operations analysis); and City and County of San Francisco, Planning Department, 2008 (constructibility issues).
Prepared by: Ricondo & Associates, Inc., January 2011.

2.2.4.3 Estimated Preliminary Construction Costs: Relocation Sites

Preliminary construction costs were estimated for the three sites carried forward from the secondary screening assessment—Sites 6B, 13, and 13A—as presented in **Table II-4**. Of the three sites, Site 13A was identified as the least costly to construct.

Table II-4

Preliminary Construction Cost Estimates of Relocation Sites

Site	Preliminary Construction Cost Estimate
6B	$78,884,000
13	$69,365,000
13A	$68,669,000

Note: Construction costs were based on the construction contract award for new ATCT facilities at Phoenix Deer Valley Airport and adjusted for comparable costs in the San Francisco area. These cost estimates reflect start of construction in 2011. A delay in the start of construction or unanticipated site access or staging issues would increase these estimated costs.

Source: U.S. Department of Transportation, Federal Aviation Administration, Los Angeles Terminal Engineering Center, *San Francisco International Airport, San Francisco, California, Airport Traffic Control Tower Site Study, FINAL Report,* October 2008.
Prepared by: Ricondo & Associates, Inc., January 2011.

2.2.4.4 Selection of Preferred Site for Relocation of ATCT Facilities

Following the secondary screening assessment, the remaining sites were Sites 6B, 13, and 13A. All of the three sites would introduce low to medium risk hazards to safe air traffic operations. Site 6B would introduce the least amount of risk to safe air traffic operations; however, this site failed several object discrimination tests, involved the tallest of the three alternative towers, and would thus be the most expensive to construct. The risk hazards associated with Sites 13 and 13A could be mitigated to low. All three remaining sites are located within the already developed terminal complex and would not present differing environmental impacts. In terms of constructibility, Site 13 would interfere with access to the existing San Francisco Police Department facility at Terminal 1, and Site 13A was the closest of all three sites to existing electrical utility infrastructure. Therefore, Site 13A was selected as the preferred alternative. The FAA concluded in the ATCT Site Survey that Site 13A was operationally suitable, presented no unacceptable risks to the National Airspace System, had the lowest construction costs, presented few constructibility challenges, and would not affect aircraft operations following instrument flight rules (i.e., navigation by instrument reference rather than visual reference).

Given that all three sites would not be anticipated to significantly impact environmental resources, Site 13A, being the lowest cost site that presented the fewest object discrimination and constructibility challenges, was identified by the FAA as the preferred site for relocation of ATCT facilities, and Sites 6B and 13 were eliminated from further consideration. Thus, relocation of ATCT facilities to Site 13A is retained for further analysis as the Proposed Action.

A summary of the alternatives evaluation process to identify the preferred ATCT relocation site is provided in **Table II-5**.

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Table II-5

Alternatives Evaluation Summary of ATCT Relocation

Evaluation Criteria	1	2	3	12	13	13A	14	15
Initial Screening: Preliminary Site Assessment								
– Visual Obstructions	Viable	Viable	Not viable	Viable	Viable–mitigated	Viable–mitigated	Viable	Not viable
– Operational Issues	Not viable	Not viable	Viable	Viable	Viable	Viable	Viable	Viable
– Constructibility Issues	Not viable	Viable	Viable	Not viable	Viable	Viable	Not viable	Viable
Site Feasibility Determination	Not viable	Not viable	Not viable	Not viable	Viable	Viable	Not viable	Not viable
Carry Forward to Secondary Screening?	**No**	**No**	**No**	**No**	**Yes**	**Yes**	**No**	**No**
Secondary Screening: Detailed Site Assessment								
– Safety of Air Traffic Operations					Passed–mitigated	Passed–mitigated		
– Constructibility Issues					No	No		
Detailed Assessment Findings					Carried forward	Carried forward		
Carry Forward to Preliminary Construction Cost Estimate?					**Yes**	**Yes**		
Preliminary Construction Cost Estimate and Final Considerations								
– Estimated Construction Cost [1/]					$69,365,000	$68,669,000		
– Environmental Considerations					No	No		
– Other Considerations					Conflict with San Francisco Police Department site	Closest to existing electrical utility infrastructure		
Retain Site for Environmental Analysis?					**No**	**Yes**		

Notes:

1/ Construction costs were based on the construction[illegible]ates reflect the start of construction in 2011. A delay in the start of construction or unanticipated site acces

2/ This site had some object discrimination issues, bu

Sources: U.S. Department of Transportation, Federal Aviation Administ[illegible]al screening, secondary screening-safety of air traffic operations, and estimated construction costs); and City and County of San Fran

Prepared by: Ricondo & Associates, Inc., April 2011.

Table II-5

Alternatives Evaluation Summary of ATCT Relocation Sites

Evaluation Criteria	Alternative Relocation Sites																			
	1	2	3	3A	4	4A	5	6	6A	6B	7	8	9	10	10A	11	12	13	13A	14	15
Initial Screening: Preliminary Site Assessment																					
– Visual Obstructions	Viable	Viable	Not viable	Viable	Not viable	Viable-mitigated	Not viable	Not viable	Not viable	Viable–mitigated or low risk	Viable	Viable	Viable	Viable	Viable	Viable	Viable	Viable–mitigated	Viable–mitigated	Viable	Not viable
– Operational Issues	Not viable	Not viable	Viable	Viable	Viable	Viable	Not viable	Viable	Viable	Viable	Not viable	Not viable	Not viable	Not viable	Not viable	Not viable	Viable	Viable	Viable	Viable	Viable
– Constructibility Issues	Not viable	Viable	Viable	Viable	Viable	Viable	Not viable	Viable	Viable	Viable	Not viable	Not viable	Not viable	Not viable	Not viable	Not viable	Not viable	Viable	Viable	Not viable	Viable
Site Feasibility Determination	Not viable	Not viable	Not viable	Viable	Not viable	Viable	Not viable	Not viable	Not viable	Viable	Not viable	Not viable	Not viable	Not viable	Not viable	Not viable	Not viable	Viable	Viable	Not viable	Not viable
Carry Forward to Secondary Screening?	**No**	**No**	**No**	**Yes**	**No**	**Yes**	**No**	**No**	**No**	**Yes**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**Yes**	**Yes**	**No**	**No**
Secondary Screening: Detailed Site Assessment																					
– Safety of Air Traffic Operations				Passed–mitigated		Passed[2/]–mitigated				Passed–mitigated								Passed–mitigated	Passed–mitigated		
– Constructibility Issues				Yes		Yes				No								No	No		
Detailed Assessment Findings				Eliminated		Eliminated				Carried forward								Carried forward	Carried forward		
Carry Forward to Preliminary Construction Cost Estimate?				**No**		**No**				**Yes**								**Yes**	**Yes**		
Preliminary Construction Cost Estimate and Final Considerations																					
– Estimated Construction Cost[1/]										$78,884,000								$69,365,000	$68,669,000		
– Environmental Considerations										No								No	No		
– Other Considerations										Did not pass all parameters of object discrimination test, tallest tower of 3 remaining sites								Conflict with San Francisco Police Department site	Closest to existing electrical utility infrastructure		
Retain Site for Environmental Analysis?										**No**								**No**	**Yes**		

Notes:

1/ Construction costs were based on the construction contract award for new ATCT facilities at Phoenix Deer Valley Airport and adjusted for comparable costs in the San Francisco Bay Area. These cost estimates reflect the start of construction in 2011. A delay in the start of construction or unanticipated site access or staging issues would increase these estimated costs.

2/ This site had some object discrimination issues, but was retained for the preliminary cost analysis.

Sources: U.S. Department of Transportation, Federal Aviation Administration, Los Angeles Terminal Engineering Center, *San Francisco International Airport, San Francisco, California, Airport Traffic Control Tower Site Study, FINAL Report,* October 2008 (initial screening, secondary screening-safety of air traffic operations, and estimated construction costs); and City and County of San Francisco, Planning Department, 2008 (secondary screening-constructibility issues).

Prepared by: Ricondo & Associates, Inc., April 2011.

2.3 Alternatives Retained for Analysis and Identification of the Proposed Action

Based on the evaluation of alternatives, two alternatives were retained for evaluation in this EA:

- No Action alternative
- Relocation of ATCT facilities to Site 13A (Proposed Action)

Of these two alternatives, only the alternative to relocate ATCT facilities to Site 13A meets the purpose and need for the Proposed Action; thus, this alternative was identified as the Proposed Action. Although three relocation sites (Sites 6B, 13, and 13A) met the purpose and need for the Proposed Action, Site 13A was the optimal site of the three alternative relocation sites. Furthermore, all three sites are located in the already developed terminal area and are not likely to differ from each other in terms of significant environmental impacts. Therefore, the only relocation site carried through the environmental analysis is Site 13A, the Proposed Action.

FAA guidance states that: "If there are no unresolved conflicts concerning alternative uses of available resources, the range of alternatives may be limited to the no action and proposed action alternatives."[12] The Proposed Action would occur on developed Airport property and no unresolved conflicts concerning alternative uses of available resources were identified. Although the No Action alternative would not meet the stated purpose and need for the Proposed Action, it was retained for analysis in this EA to comply with Title 40 CFR 1502.14(d), which requires consideration of the no action alternative and to comply with FAA Order 1050.1E. Thus, only the No Action and Proposed Action alternatives are analyzed in detail in this EA.

2.4 Sponsor's Preferred Alternative

The Proposed Action, as identified in Section 1.4, is the Sponsor's preferred alternative. Because the Proposed Action would meet the purpose and need and would not result in any permanent environmental impacts, it is also the environmentally preferred alternative.

2.5 Federal Laws and Regulations Considered

In accordance with FAA Order 1050.1E, Paragraph 405(d)(4), the relevant federal laws and statutes, executive orders, and other federal regulations considered during preparation of this EA are listed in **Tables II-6**, **II-7**, and **II-8**, respectively.

[12] U.S. Department of Transportation, Federal Aviation Administration, Order 1050.1E, *Environmental Impacts Policies and Procedures,* Change 1, paragraph 405d, effective March 20, 2006.

Table II-6

Federal Laws and Statutes Considered

	Citation
National Environmental Policy Act of 1969	42 United States Code (U.S.C.) 4321 *et seq.*
Clean Air Act of 1970, as amended	42 U.S.C. 7401 *et seq.*
Department of Transportation Act of 1966, Section 4(f)	49 U.S.C. 303(c)
Aviation Safety and Noise Abatement Act of 1979	49 U.S.C. 47501 *et seq.*
Federal Aviation Act	49 U.S.C. 40101 *et seq.*
Endangered Species Act of 1973	16 U.S.C. 1531 *et seq.*
Fish and Wildlife Coordination Act of 1958	16 U.S.C. 661 *et seq.*
Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Community Environmental Response Facilitation Act of 1992	42 U.S.C. 6901 *et seq.*
Resource Conservation and Recovery Act of 1976, as amended by the Solid Waste Disposal Act of 1980	42 U.S.C. 6901 *et seq.*
National Historic Preservation Act of 1966, as amended	16 U.S.C. 470 *et seq.*
Archaeological and Historic Preservation Act of 1974, as amended	16 U.S.C. 469 *et seq.*
Federal Water Pollution Control Act of 1972, as amended (commonly referred as the Clean Water Act)	33 U.S.C. 1251 *et seq.*
Rivers and Harbors Act of 1899, Section 10	33 U.S.C. 403 *et seq.*
Farmland Protection Policy Act	7 U.S.C. 4201 *et seq.*
Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970	42 U.S.C. 4601 *et seq.*
Wild and Scenic Rivers Act of 1968	16 U.S.C. 1271 *et seq.*
Toxic Substances Control Act	15 U.S.C. 2601 *et seq.*
Coastal Zone Management Act of 1972	16 U.S.C. 1452 *et seq.*
Oil Pollution Control Act of 1990	33 U.S.C. 2701 *et seq.*

Source: Ricondo & Associates, Inc., March 2011.
Prepared by: Ricondo & Associates, Inc., March 2011.

Table II-7

Executive Orders Considered

	Citation
Executive Order 11593, *Protection and Enhancement of the Cultural Environment*	36 Federal Register (FR) 8921
Executive Order 11988, *Floodplain Management*	43 FR 6030
Executive Order 11990, *Protection of Wetlands*	42 FR 26961
Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*	59 FR 7629
Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*	62 FR 19883

Source: Ricondo & Associates, Inc., March 2011.
Prepared by: Ricondo & Associates, Inc., March 2011.

Table II-8

FAA Orders, Advisory Circulars, and Federal Regulations Considered

U.S. Department of Transportation and FAA Orders

- U.S. Department of Transportation (DOT), Federal Aviation Administration (FAA) Order 1050.1E: *Environmental Impacts: Policies and Procedures*
- U.S. DOT, Order 5680.1: *Final Order to Address Environmental Justice in Low-Income and Minority Populations*
- U.S. DOT, Order 5650.2: *Floodplain Management and Protection*
- U.S. DOT, Order 5660.1A: *Preservation of the Nation's Wetlands*
- U.S. DOT, FAA Order 6480.4A, *Airport Traffic Control Tower Siting Process*
- U.S. DOT, FAA Order 6480.7D, *Airport Traffic Control Tower and Terminal Radar Approach Control Facility Design Guidelines*
- U.S. DOT, FAA Order JO 6480.7E, *Airport Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON) Design Policy*

FAA Advisory Circulars

- U.S. DOT, FAA Advisory Circular 150/5020-1: *Noise Control and Compatibility Planning for Airports*
- U.S. DOT, FAA Advisory Circular 150/5200-33A: *Hazardous Wildlife Attractants on or near Airports*
- U.S. DOT, FAA Advisory Circular 36-3H: *Estimated Airplane Noise Levels in A-Weighted Decibels*
- U.S. DOT, FAA Advisory Circular 150/5300-13, *Airport Design*
- U.S. DOT, FAA Advisory Circular 150/5370-10A: *Standards for Specifying Construction of Airports*

Code of Federal Regulations

- Title 14 Code of Federal Regulations (CFR) Part 71: *Designation of Class A, Class B, Class C, Class D, and Class E Airspace Areas; Airways; Routes; and Reporting Points*
- Title 14 CFR Part 77: *Objects Affecting Navigable Airspace*
- Title 14 CFR Part 135: *Operating Requirements: Commuter and On-Demand Operations and Rules Governing Persons on Board Such Aircraft*
- Title 14 CFR Part 150: *Airport Noise Compatibility Planning*
- Title 40 CFR Part 93: *Determining Conformity of Federal Actions to State or Federal Implementation Plans, Subpart B*
- Title 40 CFR Part 122: *EPA Administered Permit Programs: The National Pollutant Discharge Elimination System*
- Title 40 CFR Part 123: *State Program Requirements*
- Title 40 CFR Part 124: *Procedures for Decisionmaking*
- Title 40 CFR Part 172: *Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements*

Source: Ricondo & Associates, Inc., March 2011.
Prepared by: Ricondo & Associates, Inc., March 2011.

III. Affected Environment

The affected environment for the relocated ATCT facilities encompasses those areas that would be directly or indirectly affected by the Proposed Action if it is implemented. This chapter identifies the potentially affected geographic areas and documents existing conditions within those areas. In accordance with FAA Order 1050.1E, those resources that could potentially be affected by the Proposed Action are identified herein.

3.1 Identification and Description of Study Area

San Francisco International Airport is located on the western shore of the San Francisco Bay about 13 miles south of downtown San Francisco. While the Airport is owned and operated by the CCSF, it lies in unincorporated San Mateo County on approximately 5,200 acres of land. Tidelands encompass approximately 2,500 acres of Airport property. Exhibit I-1, presented in Chapter I of this EA, shows the location of the Airport in the general San Francisco Bay Area, as well as the location of the proposed ATCT on the Airport. Adjacent to the Airport are the cities of South San Francisco (northwest), San Bruno (west), Millbrae (southwest), and Burlingame (south).

An Area of Potential Effect (APE) was defined based on the area that could be disturbed during construction, would be needed for construction staging, or would be affected by operation of the proposed ATCT (see **Exhibit III-1**). The proposed ATCT facilities would be located in and adjacent to Courtyard 2 and Terminal 2, near Boarding Area C, Gate C41. Existing conditions at this site consist of asphalt-paved exterior areas and terminal buildings. Additional construction would occur in Terminal 2 for the demolition of Levels 4 through 6 in the main structure and the existing ATCT above the existing Terminal 2 roofline (Levels 7 through 11). Construction staging for the proposed ATCT would occur at Gate C41.

While the APE was defined by the direct effects of the Proposed Action, the Study Area was defined more broadly to include areas that could be visually affected by the new ATCT[1] (see **Exhibit III-2**). An area roughly one mile in diameter surrounding the proposed ATCT location was used to define the limits of the Study Area. The Study Area contains mostly Airport property, but also includes the U.S. Coast Guard Station, Bay Front Park, and some residential areas of Millbrae. No farmlands or wild and scenic rivers are present within the Study Area; thus, these resources are not discussed in this EA.

3.2 Existing Land Use and Zoning

As stated above, the Study Area primarily consists of Airport property, including terminal buildings, roadways, apron areas, taxiways, runways, hangars, and other associated Airport infrastructure. The Study Area also includes portions of San Francisco Bay, unincorporated San Mateo County, the City of Burlingame, and the City of Millbrae (see **Exhibit III-3**).

[1] As stated in Chapter I, relocation of the ATCT would not affect (increase or decrease) the number of aircraft operations accommodated at SFO or the routing of aircraft in the air or on the ground at the Airport, thus aircraft noise was not considered in the definition of the Study Area.

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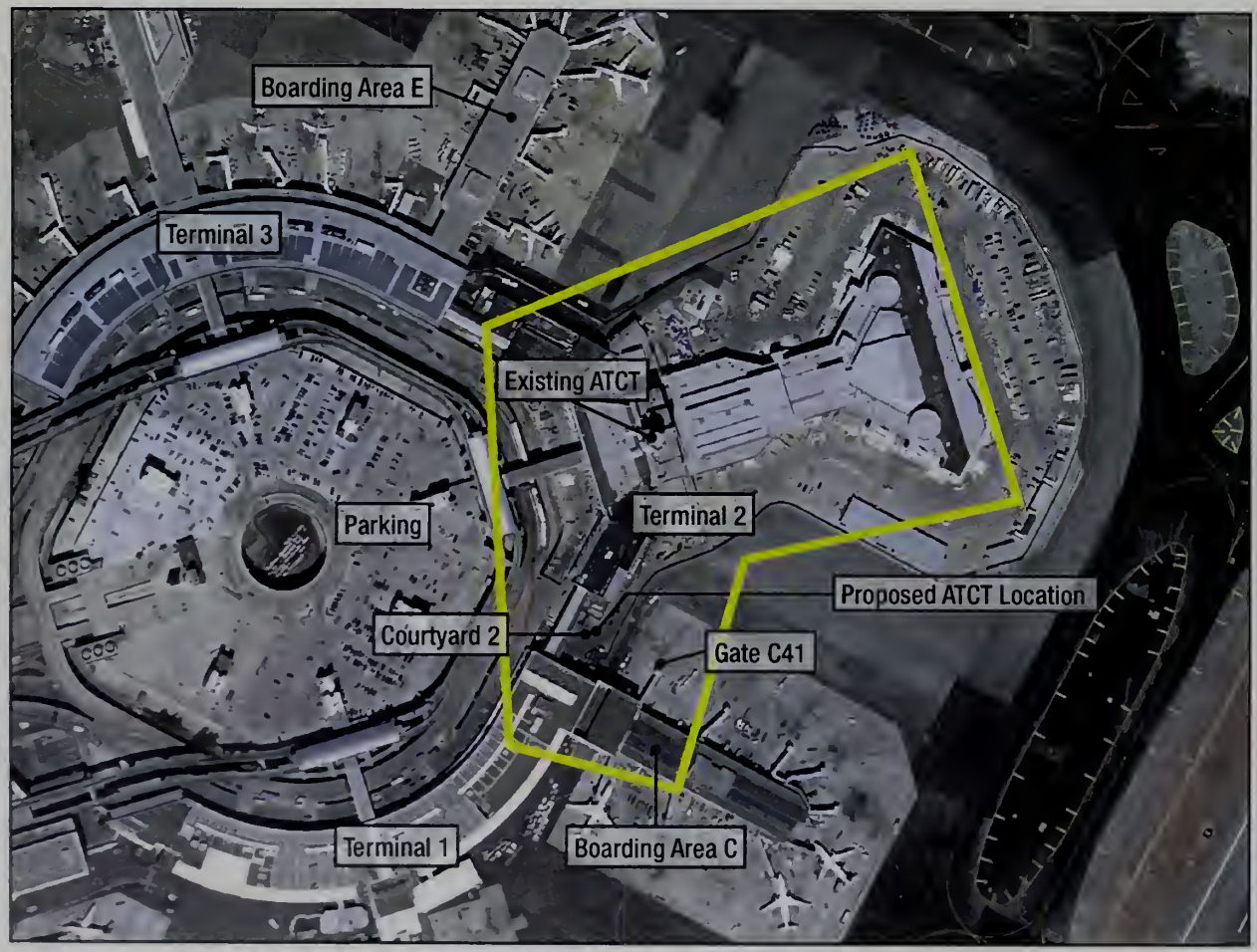

Legend

Area of Potential Effect Boundary

Sources: GoogleEarth Pro, February 2011; Ricondo & Associates, Inc., February 2011.
Prepared by: Ricondo & Associates, Inc., February 2011.

Exhibit III-1

Not to Scale

north

Area of Potential Effect

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Legend

- Area of Potential Effect Boundary
- Study Area

Source: Ricondo & Associates, Inc., February 2011
Prepared by: Ricondo & Associates, Inc., February 2011

Exhibit III-2

Not to Scale

north

Study Area

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LEGEND

- Limited Access Highway
- State Routes
- Major Roads
- Railroads
- City Boundaries
- Airport Property Boundary

Land Use

- Agriculture
- Airport
- Open Space / Parks
- Commercial
- Industrial / Mining
- Institutional / Public
- Multifamily Residential
- Mobile Homes
- Single Family Residential
- Water

Sources: San Mateo County, Planning and Development Division, City of South San Francisco, General Plan, 1999; City of
Prepared by: Ricondo & Associates, Inc., February 2011.

Exhibit III-3

0 2,500 ft.

north

Generalized Land Use

LEGEND

- Limited Access Highway
- State Routes
- Major Roads
- Railroads
- City Boundaries
- Airport Property Boundary

Land Use

- Agriculture
- Airport
- Open Space / Parks
- Commercial
- Industrial / Mining
- Institutional / Public
- Multifamily Residential
- Mobile Homes
- Single Family Residential
- Water

Sources: San Mateo County, Planning and Development Division, North County Area San Mateo County General Plan, Land Use, July 2009; City of Burlingame, General Plan, April 2000; City of Millbrae, General Plan, November 2008; City of South San Francisco, General Plan, 1999; City of San Bruno, General Plan, December 2008.
Prepared by: Ricondo & Associates, Inc., February 2011.

Exhibit III-3

0 2,500 ft.

north

Generalized Land Use

The San Mateo County General Plan, which provides a framework for County zoning and land use decisions, identifies the Airport site as Airport, Transportation Related.[2] The Airport is zoned as M-1, Light Industrial District. [3, 4]

Existing land uses in the portion of the City of Burlingame that lies within the Study Area consist of commercial and industrial, transportation, and utilities, as defined in the City's specific plans for the Bayfront and the North Burlingame/Rollins Road areas. The *Burlingame Bayfront Specific Plan* identifies the area east of U.S. Highway 101 as office and warehouse uses, and the area east of Old Bayshore Highway as waterfront commercial uses. These land uses are consistent with the zoning for these areas (OM-Office Manufacturing and C4-Waterfront Commercial).[5] The *North Burlingame/Rollins Road Specific* Plan identifies the areas on either side of Rollins Road as industrial and office space uses, consistent with the zoning for these areas.[6]

Single family residential, multifamily residential, public, mixed use, industrial, transportation, utilities, and commercial land uses are located in the portion of the Study Area contained within the City of Millbrae.[7] The City of Millbrae has also adopted a plan for the area surrounding the Bay Area Rapid Transit (BART)/Caltrain Station, located west of the U.S. Highway 101 and Millbrae Avenue interchange. This plan identifies commercial, commercial mixed use, public, quasi-public, and residential mixed uses in the areas surrounding the train station.[8] Zoning has been established by the City of Millbrae, Community Development Department and is generally consistent with the general plans.[9]

3.3 Demographics and Socioeconomic Profile

Table III-1 presents historical and projected population, employment, and number of households in the areas surrounding SFO for 1990 and 2000 based on U.S. Census data,[10] and for 2010, 2015, and 2020 based on data prepared by the Association of Bay Area Governments, the Metropolitan Planning Organization for the San Francisco Bay Area.

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2 San Mateo County, Building and Planning Department, *North County Area San Mateo County General Plan, Land Use* (undated); http://www.sforoundtable.org/P&B/pb_general_plan.html (accessed January 20, 2011).

3 San Mateo County Building and Planning Department, *Zoning Maps for Unincorporated San Mateo County;* http://www.sforoundtable.org/P&B/pb_zoning_maps.html (accessed January 20, 2011).

4 San Mateo County, Building and Planning Division, Environmental Services Agency, *Zoning Regulations*, July 1999.

5 City of Burlingame, Planning Department, *Burlingame Bayfront Specific Plan*, as approved by the Burlingame City Council, Resolution No. 26-2004, April 5, 2004, and as amended by the City Council, Resolution No. 58-2006, August 21, 2006.

6 City of Burlingame, Planning Department, *North Burlingame/Rollins Road Specific Plan*, as approved by the Burlingame City Council, Resolution No. 85-2004, September 20, 2004, and as amended by the City Council, Resolution No. 13-2007, February 5, 2007.

7 City of Millbrae, Community Development Department, *City of Millbrae General Plan, 1998-2015*, adopted November 24, 1998.

8 City of Millbrae, Community Development Department, *Millbrae Station Area Specific Plan*, adopted 1998; http://www.ci.millbrae.ca.us/index.aspx?page=239 (accessed January 20, 2011).

9 City of Millbrae, Community Development Department, *Zoning Database*, 2011; http://public.ci.millbrae.ca.us/zonemap.php (accessed January 20, 2011).

10 Complete 2010 U.S. Census data were not available at the time this draft EA was prepared. The U.S. Department of Commerce, Bureau of the Census released population data for each state in February and March, but employment and number of household data were not yet available.

Table III-1

Population, Employment, and Households in Study Area Municipalities, 1990-2020

Municipality	1990 [1/]	2000	2010	2015 [2/]	2020 [2/]
Population					
Burlingame	26,801	28,158 [1/]	28,806 [1/]	30,902	32,617
Millbrae	20,412	20,718 [1/]	21,532 [1/]	22,608	23,606
San Bruno	38,961	40,165 [1/]	41,114 [1/]	45,564	48,566
South San Francisco	54,312	60,552 [1/]	63,632 [1/]	66,596	69,691
San Mateo County	649,623	707,161 [1/]	718,451 [1/]	766,891	801,305
Employment					
Burlingame	n.a.	28,745 [2/]	23,304 [2/]	25,342	27,930
Millbrae	n.a.	7,016 [2/]	6,960 [2/]	7,828	8,570
San Bruno	n.a.	17,054 [2/]	14,416 [2/]	16,053	18,128
South San Francisco	n.a.	45,184 [2/]	43,577 [2/]	46,211	48,973
San Mateo County	n.a.	386,497 [2/]	346,332 [2/]	373,363	404,389
Households					
Burlingame	12,375	12,511 [1/]	13,036 [2/]	13,622	14,229
Millbrae	7,967	7,956 [1/]	8,209 [2/]	8,520	8,840
San Bruno	14,660	14,677 [1/]	15,821 [2/]	16,640	17,500
South San Francisco	18,588	19,677 [1/]	20,630 [2/]	21,740	22,830
San Mateo County	242,348	254,103 [1/]	264,408 [2/]	275,704	287,400

Notes:
n.a. = not available in comparable format
1/ U.S. Census data.
2/ Estimated by the Association of Bay Area Governments.

Sources: U.S. Census data, provided by the Metropolitan Transportation Commission and the Association of Bay Area Governments; www.bayareacensus.ca.gov (accessed January 20, 2011); Association of Bay Area Governments, *Projections 2009*, San Mateo County, August 2009.
Prepared by: Ricondo & Associates, Inc., April 2011.

Table III-2 presents income and poverty information for the municipalities surrounding the Airport in 1999, as reported in the 2000 U.S. Census. **Table III-3** shows racial characteristics of the municipalities surrounding the Airport in 2010.

Table III-2

Income and Poverty Data for Study Area Municipalities in 1999

	Municipality				
Statistic	Burlingame	Millbrae	San Bruno	South San Francisco	San Mateo County
Median Household Income	$68,526	$68,404	$62,081	$61,764	$70,819
Median Family Income	$91,309	$82,061	$70,251	$66,598	$80,737
Per Capita Income	$43,565	$33,193	$26,360	$23,562	$40,383
Individuals in Poverty	1,570	693	1,774	3,151	40,692
Percent Individuals in Poverty	5.7%	3.4%	4.4%	5.2%	5.8%

Source: U.S. Census data, provided by the Metropolitan Transportation Commission and the Association of Bay Area Governments; www.bayareacensus.ca.gov (accessed January 20, 2011).
Prepared by: Ricondo & Associates, Inc., January 2011.

Table III-3

Racial Characteristics of Study Area Municipalities, 2010

	Municipality									
	Burlingame		Millbrae		San Bruno		South San Francisco		San Mateo County	
Race	Population	Percent	Population	Percent	Population	Percent	Population	Percent	Population	Percent
White	19,510	67.7%	10,177	47.3%	20,350	49.5%	23,760	37.3%	383,535	53.4%
Black or African American	360	1.2%	179	0.8%	942	2.3%	1,625	2.6%	20,436	2.8%
American Indian and Alaska Native	74	0.3%	33	0.2%	246	0.6%	395	0.6%	3,306	0.5%
Asian	5,841	20.3%	9,205	42.7%	10,423	25.4%	23,293	36.6%	178,118	24.8%
Native Hawaiian and Other Pacific Islander	139	0.5%	214	1.0%	1,377	3.3%	1,111	1.7%	10,317	1.4%
Some Other Race	1,451	5.0%	776	3.6%	5,075	12.3%	9,598	15.1%	84,529	11.8%
Two or More Races	1,431	5.0%	948	4.4%	2,701	6.6%	3,850	6.1%	38,210	5.3%
Total Population	28,806	100.0%	21,532	100.0%	41,114	100.0%	63,632	100.0%	718,451	100.0%

Source: U.S. Census Bureau, 2010 Census, 2010 Redistricting Data Summary File.
Prepared by: Ricondo & Associates, Inc., April 2011.

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3.4 Natural Environment

3.4.1 Air Quality

The federal *Clean Air Act of 1970,* 42 U.S.C. 7401, et seq., as amended, requires that states identify those areas where the National Ambient Air Quality Standards (NAAQS) are not being met for specific air pollutants. The U.S. Environmental Protection Agency (U.S. EPA) designates such areas as nonattainment areas. A state with one or more nonattainment areas must prepare a State Implementation Plan (SIP) for each nonattainment area, detailing the programs and requirements that the state will implement to meet the NAAQS by the deadlines specified in the *Clean Air Act Amendments of 1990* (CAAA), Public Law 101-49. SIPs must address all pollutants for which the NAAQS are not met.

The U.S. EPA, under mandates of the CAAA, has established primary and secondary NAAQS for seven air contaminants or criteria pollutants. These contaminants are carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), lead (Pb), sulfur dioxide (SO_2), particulate matter (PM_{10}), and fine particulates ($PM_{2.5}$). The primary standards were established at levels sufficient to protect public health with a satisfactory margin of safety. The secondary standards were established to protect public welfare from other adverse effects of air pollution.

The U.S. EPA has designated San Mateo County as a nonattainment area for $PM_{2.5}$ and a marginal nonattainment area for the 8-hour ground-level O_3 NAAQS. In addition, the County is classified as a maintenance area for CO. Accordingly, for this analysis, the pollutants of concern for purposes of general conformity include CO, nitrous oxide (NO_X), and volatile organic compounds (VOCs), which are termed ozone precursors, and $PM_{2.5}$.

3.4.2 Water Quality

The general site geology at SFO consists of fill materials, overlying mud from the San Francisco Bay. The fill is generally 5- to 10-feet thick and occurs mostly in the vadose zone.[11] The site hydrogeology generally consists of two groundwater-bearing zones beneath the Airport. The first groundwater-bearing zone is known as the "A-fill" zone and is located within the artificial fill at 5 to 10 feet below the ground surface. The second groundwater zone is the "A" zone, which exists in the sandy units beneath the bay mud (the ground beneath the artificial fill). This second groundwater zone is isolated from the "A-fill" zone because the bay mud represents a relatively impermeable barrier that impedes the vertical migration of groundwater.[12]

Several hazardous material releases have occurred at the Airport, resulting in localized contamination of soil and groundwater. All of these releases involved fuel spills or leaks, and all have either been cleaned up, are currently under remediation, or are being monitored. The groundwater investigation, remediation, and monitoring program at SFO is mandated by San Francisco Bay Regional Water Quality Control Board (RWQCB) Final Order 99-045. Groundwater remediation since 1998 at Boarding Areas B and C in the vicinity of Courtyard 2 (the Proposed Action site) had removed measurable free product as of December 2009. The remediation at Boarding Areas B and C is largely complete.[13]

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[11] The vadose zone is generally considered to be the layers of earth above the permanent groundwater level.

[12] Harding Lawson Associates, *Task 2B – Fuel Hydrant Investigation, Delta Boarding Areas B and C, San Francisco International Airport, San Mateo County, California,* December 1995.

[13] Environmental Cost Management Inc., *2009 Second Semi-Annual Groundwater Monitoring, System Operations, and Soil Vapor Monitoring Report, Delta Airlines, Inc. Boarding Areas B and C, San Francisco International Airport*, June 10, 2010.

3.4.3 Wetlands

No federally protected wetlands (as defined by Section 404 of the Clean Water Act) under the jurisdiction of the U.S. Army Corps of Engineers or the San Francisco Bay RWQCB are known to exist within the APE; however, jurisdictional wetlands do exist within the Study Area, primarily along the edges of existing Airport property. The closest wetland is about 2,500 feet east of the APE, along the San Francisco Bay. The San Francisco Bay Conservation and Development Commission (BCDC) has jurisdiction over all tidal areas of San Francisco Bay and a shoreline band extending 100 feet inland from the mean high-tide line.[14] The APE is not within BCDC's jurisdiction.

3.4.4 Floodplains

The Federal Emergency Management Agency (FEMA) publishes Flood Insurance Rate Maps (FIRMs) that identify 100-year floodplain boundaries. The FIRM panels for SFO indicate that the 100-year floodplain does extend onto Airport property, primarily in the northeastern section of the Airport site. However, as shown on **Exhibit III-4**, the APE lies outside of the 100-year floodplain. SFO is in the process of coordinating with FEMA to reflect improvements to the sea wall along the shoreline perimeter of the Airport.

3.4.5 Coastal Areas

The BCDC is the agency responsible for implementing the provisions of the Coastal Zone Management Act under the State of California's Coastal Zone Management Program. The BCDC has jurisdiction over all tidal areas of San Francisco Bay and a shoreline band extending 100 feet inland from the mean high-tide line. As stated above, the APE is not within BCDC's jurisdiction, as it is not located within a coastal area protected by a coastal zone management program.

3.4.6 Biotic Communities

The APE is located within the terminal core of the Airport, an area that has previously been developed and is highly disturbed. No biological resources protected by local, State, or federal policies or ordinances are located within the APE. Within the broader Study Area, biological resources are associated with landscaped urban lands on and adjacent to Airport property; wildlife habitat is associated with expanses of airfield and other undeveloped areas of grassland and wetlands on and in the vicinity of Airport property; and wetland and aquatic habitats are associated with San Francisco Bay. The Airport itself is located on fill; historically, much of the land on which the Airport is situated consisted of open waters of the San Francisco Bay and tidal salt marsh.[15]

Vegetative communities include seasonal wetlands, freshwater marsh, salt marsh, mud flat and open water, California annual grassland/ruderal, and developed-landscaped areas. A number of benthic macroinvertebrate, amphibian, reptilian, avian, and small mammalian species use these habitats periodically, although some of these areas have been previously disturbed, resulting in reduced value and attractiveness for wildlife.

3.4.7 Endangered and Threatened Species

Several species known to occur within the vicinity of SFO are protected under the federal Endangered Species Act. **Table III-4** presents a list of species for which potential habitat is known to exist at or near the Airport.

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[14] San Francisco Bay Area Conservation and Development Commission, *San Francisco Bay Plan*, 1969, as amended; http://www.bcdc.ca.gov/laws_plans/plans/sfbay_plan.shtml (accessed January 25, 2011).

[15] Federal Aviation Administration, *Final Environmental Assessment, Airport Master Plan Improvements, San Francisco International Airport,* Section 4.9, "Biotic Communities," October 1998.

LEGEND

- Limited Access Highway
- State Routes
- Major Roads
- Railroads
- City Boundaries
- Airport Property Boundary
- 100-year Floodplains
- Water

Note: SFO is in the process of updating the Federal Emergency Management Agency (FEMA) floodplain map to reflect existing conditions, including the sea walls that have been constructed along the perimeter of the airport.

Source: Federal Emergency Management Agency, Preliminary Flo
Prepared by: Ricondo & Associates, Inc., February 2011.

Exhibit III-4

0 2,500 ft.

north

Floodplains

LEGEND

- Limited Access Highway
- State Routes
- Major Roads
- Railroads
- City Boundaries
- Airport Property Boundary
- 100-year Floodplains
- Water

Note: SFO is in the process of updating the Federal Emergency Management Agency (FEMA) floodplain map to reflect existing conditions, including the sea walls that have been constructed along the perimeter of the airport.

Source: Federal Emergency Management Agency, Preliminary Flood Insurance Rate Map for San Mateo County, April 18, 2008.
Prepared by: Ricondo & Associates, Inc., February 2011.

Exhibit III-4

0 2,500 ft.

north

Floodplains

Table III-4

Federal and State-Listed Species that Have Potential to Occur within the Study Area

Species Common and Scientific Names	Federal Status	State Status	Potential for Occurrence in Study Area
California red-legged frog *Rana draytonii*	FT	—[1/]	Known to occur on the Airport's property west of U.S. 101 but has never been observed nor is expected to occur east of U.S. 101 due to significant physical barriers to dispersal and lack of suitable aquatic/upland habitat.
San Francisco garter snake *Thamnophis sirtalis tetrataenia*	FE	SE	Known to occur on the Airport's property west of U.S. 101 but has never been observed nor is expected to occur east of U.S. 101 due to significant physical barriers to dispersal and lack of suitable aquatic/upland habitat.
California clapper rail *Rallus longirostris*	FE	SE	Known to occur near Bay Front Park. Four individuals heard calling in tidal marsh along southeastern edge of airfield on October 12, 2010 (field observation). Field surveys conducted for San Francisco Estuary Invasive Spartina Project detected individuals in tidal marsh south of Runway 1R in 2007, 2008, and 2009.
Green sturgeon (Southern DPS) *Acipenser medirostris*	FE [2/]	—	Individuals may occasionally be present in San Francisco Bay waters.
Longfin smelt *Spirinchus thaleichthys*	—	ST	Species likely occurs intermittently in San Francisco Bay waters.
Chinook salmon (Sacramento River winter-run ESU) *Oncorhynchus tshawytscha*	FE [2/]	SE	Individuals may occasionally be present in San Francisco Bay waters.
Chinook salmon (Central Valley spring-run ESU) *Oncorhynchus tshawytscha*	FT	ST	Individuals may occasionally be present in San Francisco Bay waters.
Steelhead (central California coast ESU) *Oncorhynchus mykiss*	FT	—	Species likely occurs intermittently in San Francisco Bay waters.

Notes:
FE = federally endangered; FT = federally threatened; SE = State endangered; ST = State threatened
DPS = distinct population segment; ESU = evolutionarily significant unit
1/ Designated as California Species of Special Concern.
2/ Critical habitat designated by U.S. Fish and Wildlife Service.

Sources: U.S. Fish & Wildlife Service, *Threatened Endangered Species Database* http://ecos.fws.gov/tess_public/ (accessed January 24, 2011) (federal status); California Department of Fish and Game, Biogeographic Data Branch, Natural Diversity Database, *State & Federally Listed Endangered & Threatened Animals of California*, January 2011 (State status); LSA Associates, Inc., *Draft Biological Assessment for the Runway Safety Area Program*, March 2011.
Prepared by: Ricondo & Associates, Inc., April 2011.

3.5 Public Lands

Section 4(f) of the DOT Act of 1966, which was recodified and renumbered as Section 303(c), dictates that, for any program or project undertaken or approved by the U.S. DOT, impacts to the use of any publicly owned land of a public park; recreation area; or wildlife and waterfowl refuge of national, state, or local significance; or land from a historic site of national, state, or local significance must be considered. The Act prohibits the use of these properties for transportation purposes unless no prudent and feasible alternative exists and all efforts have been made to minimize impacts.

No parks or public lands protected by Section 4(f) are located within the APE. No federal or State parks, recreation areas, or wildlife and waterfowl refuges are located within the Study Area. However, four municipal parks and one regional trail are located within the Study Area (see **Table III-5**). Historic resources are discussed in Section 3.6, below.

Table III-5

Public Lands Located within the Study Area

Property Name	Location (City)	Park Uses
Bay Front Park	Millbrae Avenue and Old Bayshore Highway (Millbrae)	Walking trail, benches, viewing
Bayside Manor Park	Lerida Avenue (Millbrae)	Basketball court, playground, and open field
Green Hills Park	Magnolia Avenue and Ludeman Lane	Bocce ball court, playground, open lawn, benches, and picnic areas
Marina Vista Park	Spruce Avenue and Bay Street (Millbrae)	Basketball court, playground, open field, barbecue and picnic areas
San Francisco Bay Trail	Along Old Bayshore Highway, south of SFO (Millbrae); along San Bruno Avenue (San Bruno) [1/], and north of SFO (South San Francisco) [1/]	Walking and biking trail

Notes:
1/ Portions of the San Francisco Bay Trail located outside of the Study Area.

Sources: City of Millbrae, Parks Division; http://www.ci.millbrae.ca.us/index.aspx?page=237 (accessed January 25, 2011); City of San Bruno, San Bruno Parks; http://www.sanbruno.ca.gov/parks_main.html (accessed January 25, 2011); San Francisco Bay Trail, http://baytrail.abag.ca.gov/index.html, (accessed January 25, 2011).
Prepared by: Ricondo & Associates, Inc., April 2011.

3.6 Historic, Archaeological, Architectural, and Cultural Resources

Historic, archaeological, architectural, and cultural resources consist of prehistoric and historic sites, districts, structures, artifacts, or any other physical evidence of human activity considered important to culture, subculture, or community for scientific, traditional, religious, or other reasons.

3.6.1 Archaeological Resources

Evidence of prehistoric populations on the San Francisco Peninsula (which includes San Mateo County and SFO) date to circa 3,500 B.C., with evidence of a pre-Costanoan presence as late as circa A.D. 850. The Californian Native Americans that occupied the San Francisco Peninsula at the time of contact with European explorers are known as the Costanoan, derived from the Spanish word "Costaños," meaning coast people. No native name for the Costanoan people as a whole is known to have existed prior to contact with European explorers. The Costanoans were probably neither a single ethnic group nor a political entity. The term Costanoan also designates a family of eight languages.

Archaeological evidence indicates that the San Francisco Bay region was used intensively during prehistoric times; the region was environmentally favorable, with a variety of exploitable resources from the Bay and the nearby foothills. Perennial and intermittent drainages provided potable water and riparian resources. Also, north/south travel and trade was accomplished easily, and several passes provided access to the interior San Andreas rift valleys. Hunting and gathering systems were the basis of the native populations' subsistence activities. Groups went out from the main villages to temporary camps within their territory to exploit the various seasonally available resources.

Research indicates that intensive use of plant foods (hazelnuts, acorns, tubers, and grasses), as well as the exploitation of marine and land animal resources were the basis for native diets.

Little of the prehistoric social and religious organization and structure is known from the San Francisco Bay archaeological record. Ethnographic information suggests that clusters of extended families lived habitually in the same area under a "chief" or headman. While prehistoric archaeological sites are located west of U.S. Highway 101, particularly in the vicinity of San Bruno, Crystal Springs, and Mills Creeks and on San Bruno Mountain, no archaeological resources are documented within the Study Area. Moreover, none of the bay-oriented prehistoric shellmound (refuse) sites recorded in 1909 or mound sites recorded from 1896 to 1936, lie within the Study Area.[16]

3.6.2 Historic, Architectural, and Cultural Resources

The Airport has undergone continual development and redevelopment since the Central Terminal building was constructed in 1954. As a result, several studies related to historic, architectural, and cultural resources have been completed in relation to these development projects, many of which date to recent decades. A brief overview of the most recent and relevant documents is provided below, focusing on historic, architectural, and cultural resource studies completed for SFO and the immediate environment within the past 20 years.

The earliest comprehensive architectural inventory at SFO was completed in 1991. This inventory was undertaken as part of the 1991 SFO Master Plan Final Environmental Impact Report (EIR).[17] It was concluded that all built resources at SFO were constructed after 1946 (meaning they were less than 45 years old at the time of the inventory[18]) except for four properties: U.S. Coast Guard Air Station San Francisco, which was built in the late 1930s and early 1940s; Building 958[19], a late 1930s hangar that was referred to as the "Flying Tiger" building; Building 1000; and the "Val Boiler House." It was determined that none of these properties qualifies for listing in the National Register of Historic Places (NRHP).[20]

The 1991 SFO Master Plan EIR findings were updated in a 1997 memorandum, repeating the conclusion that the four pre-1946 properties identified in the inventory did not qualify for listing in the NRHP, and adding that they were also not considered to be historic under California Environmental Quality Act (CEQA) guidelines. This memorandum, completed for the 1998 SFO Master Plan EA[21], also stated that none of the remaining post-1946 buildings at SFO appeared

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16 Environmental Science Associates, Inc., *San Francisco International Airport Master Plan Final Environmental Impact Report – Volume I: Text,* "Environmental Setting: Cultural Resources", certified by the City and County of San Francisco, May 28, 1992, pp. 183-184.

17 This inventory was completed under contract with David Chavez & Associates, which, in turn, was under contract to Environmental Science Associates. David Chavez & Associates, "Cultural Resource Evaluation for the San Francisco International Airport Master Plan EIR, San Mateo County, California," August 1990, revised February 1991.

18 Although national standards dictate the general use of 50 years as the minimum for qualifying as a potentially historic resource, the 45-year cutoff date is typical of California standards and accounts for a 5-year delay in planning and review processes.

19 Building 958 and the Flying Tiger building existed at the time of the 1991 inventory, but have since been demolished.

20 JRP Historical Consulting Services, *Historic Architectural Survey Report: Runway Reconfiguration at SFIA,* November 2001, p. 6. Although it includes multiple buildings, the Air Station was treated as a single property.

21 U.S. Department of Transportation, Federal Aviation Administration, *Final Environmental Assessment, Airport Master Plan Improvements, San Francisco International Airport, San Francisco, California,* October 2008.

eligible for inclusion in the NRHP.[22] Other buildings on the SFO campus were also reviewed as potential historic resources during preparation of the 1998 Airport Master Plan EA:

> The oldest major building at [San Francisco International Airport] is the existing Central Terminal building, which was initially constructed in 1954. The structure has been remodeled and expanded on numerous occasions throughout its history so that it has not maintained the integrity necessary to consider it a historic building. The most recent remodeling of the Central Terminal occurred in 1986. Examples of expansions to the Central Terminal include the South Terminal (built in 1962 and remodeled in 1990), the North Terminal (built in 1979), and the parking garage and roadway system. The current appearance of the Central Terminal is very different from the appearance of the structure in 1954.
>
> The only other building at [San Francisco International Airport] that will be at least 50 years old at the end of the master planning period (2006) is the UAL [United Airlines] Maintenance Center (initially constructed in 1954). The UAL Maintenance Center has been expanded several times since 1954 (most recently in 1980) and has not maintained any historic integrity.[23]

In 1998, the U.S. Coast Guard initiated an inventory and evaluation of Air Station San Francisco, which was unrelated to any previous or concurrent SFO study.[24] It was concluded that the property qualified for listing in the NRHP as a historic district. A representative of the California Office of Historic Preservation concurred with these findings for Air Station San Francisco on October 25, 1998.[25]

Terminal 2, previously known as the Central Terminal and the International Terminal, is located on the east side of the terminal complex, between Terminals 1 and 3. The existing ATCT is integrated with the Terminal 2 structure. The Terminal 2 building has been extensively renovated from an international terminal to a domestic terminal and opened in April 2011. The first two levels of the terminal building are connected with and used for passenger terminal areas. The ATCT facilities are located on Levels 6 through 11, as discussed earlier in Section 1.2. The 1984 ATCT cab, located on Level 11, provides clear views of the airfield and adjacent airspace. Flat roof surfaces top most other portions of Terminal 2, and the original 1954 ATCT cab is integrated along the eastern side of the building at Level 8.

According to information on historic properties from the CCSF, published on the National Park Service's (NPS) National Register Information System (NRIS); information from the State Office of Historic Preservation's California Register of Historical Resources; and information from the Northwest Information Center, Sonoma State University, no known historic, cultural, or archaeological sites exist within the APE. The only National Register of Historic Places eligible property close to the APE is the U.S. Coast Guard's Air Station San Francisco. The U.S. Coast Guard's Air Station was determined to be eligible as a National Register Historic District in 1999.

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22 David Chavez & Associates, Cultural Resource Consultants, memorandum to Environmental Science Associates July 3, 1997, as discussed in JRP Historical Consulting Services, *Historic Architectural Survey Report: Runway Reconfiguration at SFIA*, November 2001, p. 6.

23 Environmental Science Associates, *Report on Cultural Resources at SFIA and Effects of Proposed Master Plan*, 1997, as quoted in JRP Historical Consulting Services, *Historic Architectural Survey Report: Runway Reconfiguration at SFIA*, November 2001, p. 8.

24 Air Station San Francisco is a late 1930s-era U.S. Coast Guard Air Station. Although it is bordered on two sides by Airport property, the property is owned by the federal government and is not part of SFO, legally or operationally.

25 Cherilyn Widell, U.S. Coast Guard, letter to Susan Boyle, State Historic Preservation Officer, October 19, 1998; as noted in JRP Historical Consulting Services, *Historic Architectural Survey Report: Runway Reconfiguration at SFIA*, November 2001, p. 11.

The historic district is adjacent to the Airport on the north side and is located more than 1 mile from the APE for the proposed project. The existing ATCT is just over 1 mile (1.07 miles) southeast of the U.S. Coast Guard Air Station. The proposed ATCT would be located 1.12 miles southeast of the U.S. Coast Guard Air Station.

3.7 Past, Present, and Reasonably Foreseeable Future Actions

Cumulative impacts to environmental resources result from incremental effects of future actions combined with other past, present, and planned projects in the area. Cumulative impacts can result from individually minor, but collectively substantial, actions undertaken over a period of time by various agencies (federal, state, and local) or individuals. In accordance with NEPA, a discussion of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or planned for implementation in the near future, is required. For purposes of this analysis, projects implemented within the last 5 years or proposed to be implemented within the next 5 years located within 1-mile of the proposed ATCT location were identified (see **Table III-6**).

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Table III-6 (1 of 4)

Past, Present, and Reasonably Foreseeable Future Actions in the Study Area

Project Name	Location	Description	Current Status
PAST ACTIONS			
Shoreline Protection and Security Project	SFO	Seawall of 14,175 linear feet/10 feet high; within Bay Conservation and Development Commission jurisdiction.	Completed in 2007
SFO Executive Airport Addition and New Hangar C	SFO	The proposed project is the addition of approximately 2,400 square feet to the existing 26-foot high, 10,000-square-foot Executive Terminal, built in 1996, and construction of a new 37-foot high, 25,000-square-foot aircraft storage Hangar C containing approximately 4,000 square feet of office space at the northern edge of SFO.	Renovations completed 2010; new construction pending
Runway 1R-19L Overlay and Reconstruction	SFO	Reconstruction of approximately 200,000 square yards of runway and taxiway pavement. The project consisted of an overlay and reconstruction of Runway 1R-19L to repair deteriorating pavement, improve the surrounding drainage system, upgrade the electrical runway and taxiway lighting system, and repaint runway markings to improve visibility and safety for aircraft on the airfield.	Completed in 2009
Runway 10L-28R Overlay and Reconstruction	SFO	Structural damage on Runway 10L-28R was repaired to level the runway profile, widen shoulder pavement, upgrade the electrical lighting system, and incorporate the most current FAA design guidelines for the runway.	Completed in 2009
Peninsula Medical Center Replacement	El Camino Real/ Trousdale Drive, Burlingame	Replacement of the existing Peninsula Medical Center and related medical office buildings with a new hospital, medical office building, and parking garage. The project was proposed, in part, to comply with the seismic upgrade requirements of the Alfred E. Alquist Hospital Facilities Seismic Safety Act of 1994 (SB 1953). The existing hospital will be demolished after the replacement Medical Center is built. The replacement project will consist of an approximately 440,000-square-foot, six- to seven-story hospital, attached to an approximately 150,000-square-foot, five-story medical office building, and a separate parking garage with approximately 809 spaces, as well as approximately 681 surface parking spaces. The project additionally includes a helipad and various street and pedestrian improvements.	Construction nearing completion

Table III-6 (2 of 4)

Past, Present, and Reasonably Foreseeable Future Actions

Project Name	Location	Description	Current Status
PRESENT ACTIONS			
Runway Safety Area (RSA) Program	SFO	The RSAs for the Airport's four runways do not meet current FAA design standards prescribed in FAA Advisory Circular 150/5300-13. As a federally obligated airport certificated under 14 CFR Part 139, the CCSF is obligated by FAA Order 5200.8 to comply with FAA design standards for RSAs by 2015. This project includes designation of declared distances on existing runways, installation of engineered material arresting systems, extension of Runway 10R-28L, taxiway realignment/construction, and relocation of FAA navigational aids.	Environmental analysis phase; construction planned for 2012 through 2015
Terminal 2 Redevelopment	SFO	Boarding Area D, located in Terminal 2, which was formerly used and configured as an international terminal, and closed in December 2000 when the new International Terminal Building opened. Terminal 2 is being renovated to serve as a domestic terminal. The proposed renovation would convert the terminal from a 10-gate international widebody aircraft terminal to a 14-gate domestic narrowbody aircraft terminal. The project includes renovation of the terminal building's interior space, including holdrooms, concession spaces, baggage claim areas, and building systems.	Construction scheduled to be completed in April 2011
Hydrogen/Hythane Fueling Station	SFO	The proposed fueling station, to be located on South McDonnell Road south of Runways 1L and 1R, would dispense two types of alternative fuels – pure hydrogen and hythane, a mixture of hydrogen and compressed natural gas. Approximately 5,000 square feet of the 45,000-square-foot lot would be developed under the proposed project.	Was to be completed in 2010, but project has been delayed
Millbrae Wastewater Pollution Control Plant (WPCP) Flow Equalization	Millbrae Avenue/ US Highway 101, Millbrae	The Flow Equalization Project includes installation of a new 1.21-million-gallon flow equalization tank and associated pump stations, pipeline, and other appurtenances at the Millbrae WPCP. The project also includes replacement of and/or upgrades to other onsite facilities and construction of a new 8,400-square-foot Operations Center.	Under construction

Table III-6 (3 of 4)

Past, Present, and Reasonably Foreseeable Future Actions

Project Name	Location	Description	Current Status
Terrabay Phase II/III	U.S. Highway 101, fronting Airport Boulevard, South San Francisco	The project includes construction of two office towers totaling 665,000 square feet, 24,000 square feet of commercial space, a 200-seat performing arts center, and a child day care center.	Under construction
FUTURE ACTIONS			
Boarding Area E Renovation	SFO	Airfield and terminal system improvements, including baggage handling system, utilities, moving conveyances, telecommunications, terminal systems, architecture, holdroom seating, and building code compliance.	Work scheduled to begin mid 2011 (after Terminal 2 redevelopment is complete)
Reconstruction of Aircraft Aprons at Boarding Areas C, E, F, G, and Plot 40	SFO	Reconstruction of aircraft parking aprons to repair deteriorating and unlevel pavement and underground utilities. Plot 40 is located immediately east of the Signature Flight Support Executive Air Terminal and used by United and American Airlines. Construction of underground utilities may include repair to storm water drainage, apron lighting, and water infrastructure. Combined project total area of approximately 546,000 square yards.	Construction anticipated in 2011
Terminal 1 Renovation and Boarding Area B	SFO	Renovation of Terminal 1 and phased redevelopment of Boarding Area B. The terminal building and Boarding Area B were built in the 1960s. In 2006, the CCSF initiated a planning study for the redevelopment of Terminal 1.	Construction anticipated to begin in 2011 in phases; project completion expected in 2026
South McDonnell Road Realignment	SFO	Realignment of South McDonnell Road through the former Hilton Hotel site to create additional overnight aircraft parking spaces.	Construction scheduled to begin in approximately 2016

Table III-6 (4 of 4)

Past, Present, and Reasonably Foreseeable Future Actions

Project Name	Location	Description	Current Status
Reclaimed Water System Project	SFO	This project would allow the secondary effluent produced at the Mel Leong Treatment Plan (MLTP) to be treated to meet the requirements of California Department of Public Heath Title 22 regulations for recycled water for reuse as nonpotable water throughout the Airport. Phase I includes installation of underground pipelines to distribute treated water from the MLTP to storage tanks at Lot C, construction of tertiary and advanced treatment facilities at the MLTP, construction of an advanced treatment facility and hydropneumatic tank at Lot C, retrofitting of five existing storage tanks at Lot C, and installation of distribution pipelines from the MLTP to Lot C and Terminal 2. Phase II includes construction of one tertiary and two advanced treatment facilities, installation of a distribution system, retrofitting of storage tanks, and installation of the Supervisory Control and Data Acquisition system. Phase III consists of installation of irrigation pipelines along the McDonnell Road corridor.	Project design and environmental review projected in 2011; construction estimated to begin February 2012 and to be completed by the end of 2012
San Bruno Caltrain Station Relocation	San Mateo Avenue/San Bruno Avenue, San Bruno	Relocation of the San Bruno Caltrain station, and grade separation of right-of-way.	Construction estimated to be completed by mid-2012
Downtown Mixed-Use Project	406 San Mateo Avenue, San Bruno	Demolition of the old theater building and three adjacent bars in downtown San Bruno to construct a mixed-use building with 48 condominium units, 14,600 square feet of ground floor retail, and 152 parking spaces.	Approved by San Bruno City Council, January 2009; construction should begin in 2011

Sources: City and County of San Francisco, Planning Department, San Francisco International Airport, December 2010; CEQANet Database, www.ceqanet.ca.gov; City of South San Francisco, *Major Projects List*, August 2010; City of San Bruno, *Downtown and Transit Corridors Plan*, www.sanbrunotransitcorridors.org, accessed February 2, 2011; City of San Bruno, *Current Development Projects*, December 2010, http://www.sanbruno.ca.gov/comdev_images/CurrentProjects/Current%20Dev%20Handout/12_2010.pdf, accessed February 2, 2011.

Prepared by: Ricondo & Associates, Inc., February 2011.

IV. Environmental Consequences

The potential environmental consequences associated with the No Action and the Proposed Action alternatives are discussed in this chapter. The environmental categories evaluated, as specified in FAA Order 1050.1E,[1] are as follows:

- Noise
- Compatible Land Use
- Socioeconomic Impacts, Environmental Justice, and Children's Health and Safety Risks
- Secondary (Induced) Impacts
- Air Quality
- Water Quality
- Wetlands
- Floodplains
- Coastal Resources
- Fish, Wildlife, and Plants
- Department of Transportation Act, Section 4(f)
- Historic, Archaeological, Architectural, and Cultural Resources
- Light Emissions and Visual Impacts
- Natural Resources and Energy Supply
- Hazardous Materials, Pollution Prevention, and Solid Waste
- Construction Impacts
- Cumulative Impacts

The following environmental resources are not present within the Study Area and, therefore, would not be affected by the No Action or Proposed Action alternatives: farmlands and wild and scenic rivers.

4.1 Noise

A determination of the potential noise effects of a project is based on evaluating the noise exposure expected to result from aviation activities related to the project on individuals and noise sensitive land uses. Noise exposure expected to result from both the No Action and Proposed Action alternatives would be compared during the same timeframes. The methodology to be used in conducting aircraft noise analyses is established in FAA Order 1050.1E. The FAA has determined that the cumulative noise exposure of individuals resulting from aircraft noise must be established in terms of the yearly day-night average sound level (DNL) metric.[2]

No changes to existing air traffic patterns or aircraft movement areas would occur under the Proposed Action compared with the No Action alternative. Additionally, the Proposed Action would not result in a change in the number or type of aircraft operations at the Airport compared with the No Action alternative. Thus, no change to areas exposed to significant levels of aircraft noise in the Airport environs would occur under the Proposed Action compared with the No Action alternative.

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1 U.S. Department of Transportation, Federal Aviation Administration, Order 1050.1E, *Environmental Impacts: Policies and Procedures,* Change 1, effective March 20, 2006.

2 The FAA definition of "significance" is specified using the day-night average sound level (DNL) metric. The FAA recognizes the use of the Community Noise Equivalent Level (CNEL) for aircraft noise evaluations in California. See FAA Order 1050.1E, Appendix A, Section 14 for FAA's acceptance of CNEL as a suitable substitute for DNL.

Exhibit IV-1 depicts the 65 decibel (dB) Community Noise Equivalent Level (CNEL) noise exposure area for the Airport in 2010; **Exhibit IV-2** depicts the projected 2018 65 dB CNEL noise exposure area under both the No Action and Proposed Action alternatives. The projected 2018 CNEL noise contours represent anticipated conditions at the Airport three years after implementation of the Proposed Action. The assumptions utilized in the formulation of the noise contours can be found in **Appendix B**.

4.2 Compatible Land Use

According to Appendix A of 14 CFR Part 150, *Airport Noise Compatibility Planning,*[3] and FAA Advisory Circular 150/5020-1, *Noise Control and Compatibility Planning for Airports,*[4] a proposed action is considered to have a significant impact on land use compatibility if it causes significant increases in noise exposure over residential or other noise-sensitive land uses, such as schools, parks, and historic buildings, within areas exposed to aircraft noise of DNL 65 or higher, or 65 dB CNEL or higher. CNEL is an acceptable substitution for DNL as recognized by the FAA for aircraft noise evaluations in California. The Proposed Action would not result in any change in areas exposed to significant levels of aircraft noise in the Airport environs when compared to the No Action alternative (see Section 4.1).

FAA Order 1050.1E also requires that documentation must be included to support the required airport sponsor's assurance under 49 U.S.C. 47107(a)(10) that appropriate action, including the adoption of zoning laws, has been or will be taken, to the extent reasonable, to promote airport/community land use compatibility (see **Appendix C**). The proposed ATCT site is located on Airport property, within unincorporated San Mateo County. The San Mateo County General Plan identifies the Airport property as "Airport, Transportation Related."[5] The existing and proposed uses of the site for the relocated ATCT are consistent with this General Plan land use designation. The Airport and the proposed ATCT site are zoned as "M-1, Light Industrial District."[6,7] Efforts to promote Airport/community land use compatibility are summarized below.

4.2.1 San Mateo County Comprehensive Airport Land Use Compatibility Plan

In 1967, the California legislature adopted legislation requiring the establishment of airport land use commissions in all counties containing an airport served by a scheduled airline or with one or more airports serving the general public.[8] Each airport land use commission is responsible for developing an airport land use compatibility plan (ALUCP) that, "...will provide for the orderly growth of each public airport and the area surrounding the airport within the jurisdiction of the commission, and will safeguard the general welfare of the inhabitants within the vicinity of the airport and the public in general."[9]

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3 14 Code of Federal Regulations Part 150, *Airport Noise Compatibility Planning*, January 18, 1985, as amended.

4 U.S. Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5020-1, *Noise Control and Compatibility Planning for Airports*, August 5, 1983.

5 San Mateo County, Building and Planning Department, *North County Area San Mateo County General Plan, Land Use* (undated); http://www.sforoundtable.org/P&B/pb_general_plan.html (accessed January 20, 2011).

6 San Mateo County, Building and Planning Department, *Zoning Maps for Unincorporated San Mateo County;* http://www.sforoundtable.org/P&B/pb_zoning_maps.html (accessed January 20, 2011).

7 San Mateo County, Building and Planning Division, Environmental Services Agency, *Zoning Regulations*, July 1999.

8 California Public Utilities Code, Sections 21670-21679.5.

9 California Public Utilities Code, Section 21675.(a).

LEGEND

- Limited Access Highway
- State Routes
- Major Roads
- Railroads
- City Boundaries
- 2010 CNEL Noise Contours

Land Use

- Agriculture
- Airport
- Open Space / Parks
- Commercial
- Industrial / Mining
- Institutional / Public
- Multifamily Residential
- Mobile Homes
- Single Family Residential
- Water

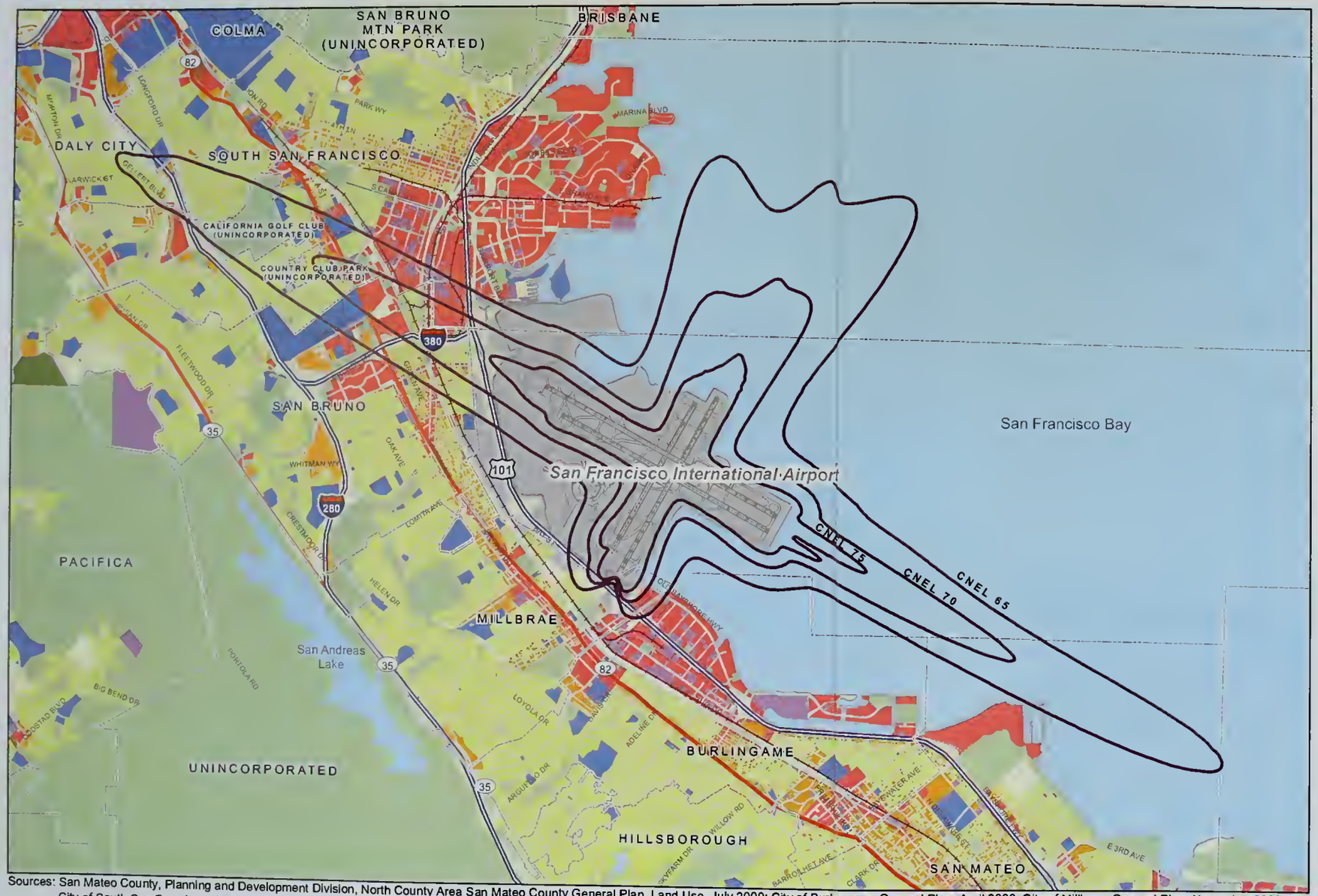
Sources: San Mateo County, Planning and Development Division, City of South San Francisco, General Plan, 1999; City of
Prepared by: Ricondo & Associates, Inc., March 2011.

Exhibit IV-1

0 5,000 ft.

north

2010 CNEL Noise Contours



LEGEND

- Limited Access Highway
- State Routes
- Major Roads
- Railroads
- City Boundaries
- 2010 CNEL Noise Contours

Land Use

- Agriculture
- Airport
- Open Space / Parks
- Commercial
- Industrial / Mining
- Institutional / Public
- Multifamily Residential
- Mobile Homes
- Single Family Residential
- Water

Sources: San Mateo County, Planning and Development Division, North County Area San Mateo County General Plan, Land Use, July 2009; City of Burlingame, General Plan, April 2000; City of Millbrae, General Plan, November 2008; City of South San Francisco, General Plan, 1999; City of San Bruno, General Plan, December 2008; BridgeNet International, 2011 (noise contours).
Prepared by: Ricondo & Associates, Inc., March 2011.

Exhibit IV-1

0 5,000 ft.

north

2010 CNEL Noise Contours

LEGEND

- Limited Access Highway
- State Routes
- Major Roads
- Railroads
- City Boundaries
- 2018 Projected CNEL Noise Contours

Land Use

- Agriculture
- Airport
- Open Space / Parks
- Commercial
- Industrial / Mining
- Institutional / Public
- Multifamily Residential
- Mobile Homes
- Single Family Residential
- Water

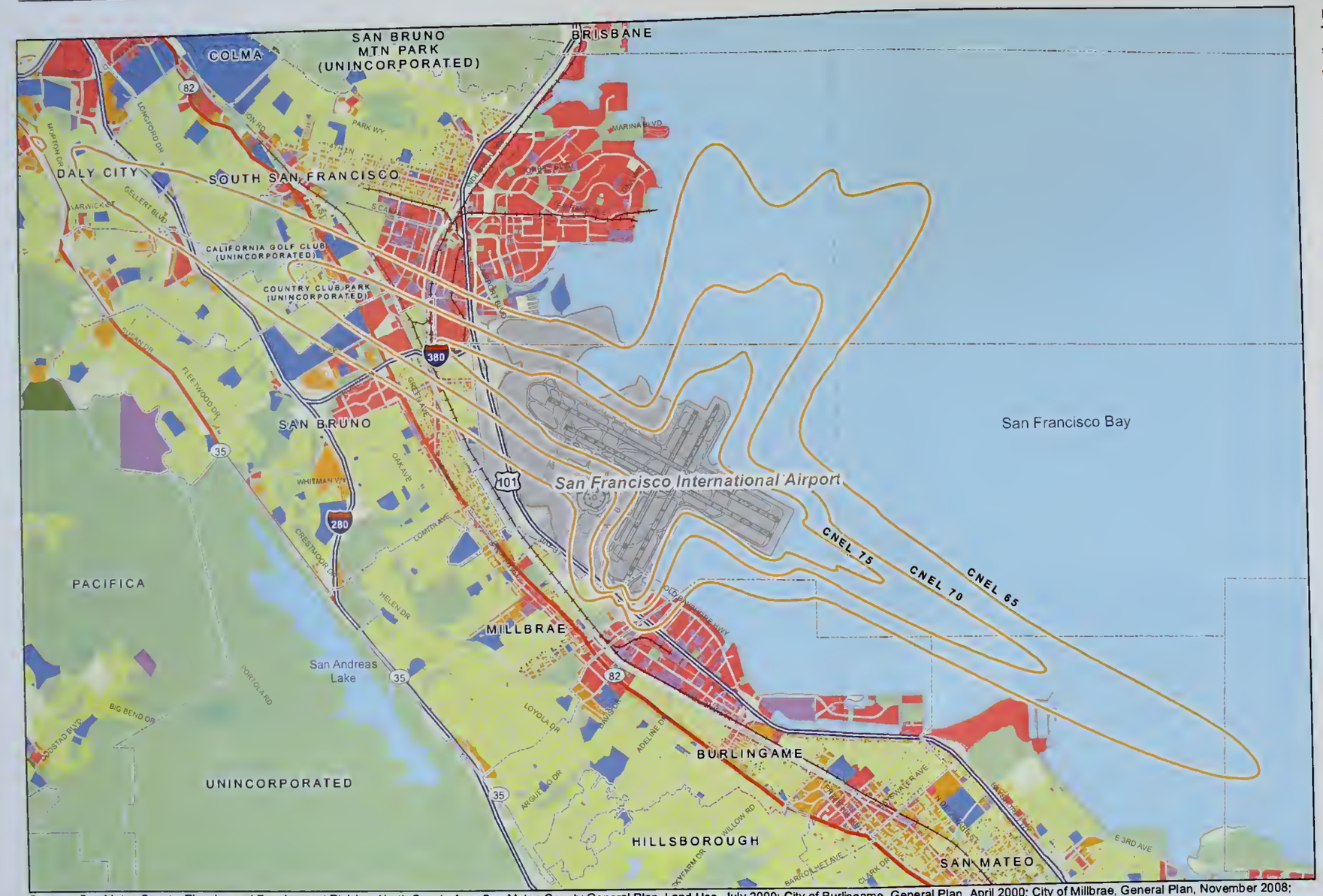
Sources: San Mateo County, Planning and Development Division, I
City of South San Francisco, General Plan, 1999; City of
Prepared by: Ricondo & Associates, Inc., March 2011.

Exhibit IV-2

0 5,000 ft.

north

Projected CNEL Noise Contours



LEGEND

- Limited Access Highway
- State Routes
- Major Roads
- Railroads
- City Boundaries
- 2018 Projected CNEL Noise Contours

Land Use

- Agriculture
- Airport
- Open Space / Parks
- Commercial
- Industrial / Mining
- Institutional / Public
- Multifamily Residential
- Mobile Homes
- Single Family Residential
- Water

Sources: San Mateo County, Planning and Development Division, North County Area San Mateo County General Plan, Land Use, July 2009; City of Burlingame, General Plan, April 2000; City of Millbrae, General Plan, November 2008; City of South San Francisco, General Plan, 1999; City of San Bruno, General Plan, December 2008; BridgeNet International, 2011 (noise contours).
Prepared by: Ricondo & Associates, Inc., March 2011.

Exhibit IV-2

0 5,000 ft.

north

2018 Projected CNEL Noise Contours

The City/County Association of Governments of San Mateo County (C/CAG) is the Airport Land Use Commission responsible for developing the ALUCP for San Francisco International Airport. The last plan adopted by the C/CAG is the *San Mateo County Comprehensive Airport Land Use Compatibility Plan* (CLUP) dated December 1996. The San Mateo County CLUP contains land use plans for SFO, as well as for Half Moon Bay and San Carlos Airports. As of February 2011, the C/CAG is in the process of updating the CLUP for SFO. The 1996 SFO Land Use Plan contains seven elements that address Airport/aircraft noise reduction:

1. **SFO aircraft noise monitoring system**. Airport management is required by the State of California to monitor airport noise and the County of San Mateo is required to review the Airport's noise monitoring data and enforce the State noise standards. Currently, 29 noise monitoring sites are located in communities surrounding the Airport.[10]

2. **Aircraft noise contours**. SFO management prepares aircraft noise contours to comply with both FAA and State of California requirements. The aircraft noise exposure maps identify those areas subjected to aircraft noise of 65 dB CNEL and higher.

3. **Aircraft noise/land use standards**. Aircraft noise/land use compatibility standards were developed for the SFO environs (see **Table IV-1**). The compatibility standards indicate if a proposed land use is "compatible," "conditionally compatible," or "incompatible" with varying noise exposure levels.

4. **SFO noise abatement regulation, as amended**. The San Francisco Airport Commission has instituted a regulation to "provide for the continual reduction of cumulative noise resulting from aircraft operations" at SFO.[11] The noise abatement regulation requires all aircraft operating at the Airport to be Stage 3 aircraft,[12] encourages aircraft operators to use ground power and air sources whenever practicable, restricts runups of mounted aircraft engines between the hours of 10:00 p.m. and 7:00 a.m., and encourages the use of established noise abatement procedures between the hours of 11:00 p.m. and 7:00 a.m.[13]

5. **SFO variance from the State noise standards**. Title 21 of the California Code of Regulations requires that any airport with incompatible land uses within the 65 dB CNEL noise contour must apply for and receive a variance from the State noise standards. The variance contains conditions with which Airport management must comply, including meeting with the SFO/Community Roundtable (see below), managing a noise abatement program, and continuing a policy of not shifting noise from one community to another.

6. **Aircraft noise insulation program** – The FAA and the San Francisco Airport Commission have jointly funded an aircraft noise insulation program. Since 1983, the CCSF has spent

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[10] SFO Noise Abatement Office, *Accomplishments and History;* http://www.flyquietsfo.com/faq_pdfs/SFOANAO_Accomplishments_History_FAQ_200906.pdf (accessed February 4, 2011).

[11] City and County of San Francisco Airport Commission, *Rules and Regulations, San Francisco International Airport*, November 2009.

[12] Stage 3 aircraft are those aircraft certificated by the FAA as complying with the noise levels prescribed in 14 CFR Part 36, *Noise Standards: Aircraft Type and Airworthiness Certification*, Appendix C, Section 36.5(a)(3), or is certificated in accordance with Chapter 3 of Annex 16 to Article 37 of the International Civil Aviation Organization Convention.

[13] City and County of San Francisco Airport Commission, "Noise Abatement Regulation," *Rules and Regulations, San Francisco International Airport*, November 2009.

$153 million to insulate over 15,000 homes, eight churches, and seven schools from aircraft noise at SFO.[14]

7. **SFO/Community Roundtable** – The SFO/Community Roundtable was created in 1981 to address aircraft noise impacts in communities near the Airport. The Roundtable monitors the noise mitigation program and provides the public with direct access to local elected officials, Airport management, FAA representatives, and airline representatives to address aircraft noise issues.

Table IV-1

Aircraft Noise/Land Use Compatibility Standards for SFO Comprehensive Airport Land Use Compatibility Plan Area

Land Use	Community Noise Exposure Level (CNEL) Range (dB)	General Land Use Criteria
Residential	Less than 65	Compatible
	65 to 70	Conditionally Compatible
	Over 70	Incompatible
Commercial	Less than 70	Compatible
	70 to 80	Conditionally Compatible
	Over 80	Incompatible 1/
Industrial	Less than 75	Compatible
	75 to 85	Conditionally Compatible
	Over 85	Incompatible 1/
Open	Less than 75	Compatible
	Over 75	Incompatible 2/

Notes:
Compatible = Little noise impact and no special noise insulation requirements for new construction.
Conditionally Compatible = New construction or development should be undertaken only after an analysis of noise reduction requirements and noise insulation features have been included in design.
Incompatible = New construction or development should not be undertaken.
CNEL is an acceptable substitution for DNL as recognized by the FAA for aircraft noise evaluations in California.
1/ Unless related to airport activities or services. Conventional construction will generally be inadequate and special noise insulation features should be included in construction.
2/ Land uses involving concentrations of people (spectator sports and some recreational facilities) or of animals (livestock farming and animal breeding) should generally be avoided.

Source: City/County Association of Governments of San Mateo County, *San Mateo County Comprehensive Airport Land Use Compatibility Plan*, December 1996.
Prepared by: Ricondo & Associates, Inc., January 2011.

4.2.2 Local Noise Compatibility Policies

In addition to the land use compatibility plans defined in the San Mateo County CLUP, the general plans of the jurisdictions in the vicinity of the Airport contain policies related to noise and land use compatibility, further demonstrating efforts to promote the compatibility of SFO with its surrounding communities. A summary of these policies is provided in **Table IV-2**.

[14] SFO Noise Abatement Office, *Accomplishments and History;* http://www.flyquietsfo.com/faq_pdfs/SFOANAO_Accomplishments_History_FAQ_200906.pdf (accessed February 4, 2011).

Table IV-2

Noise Policies Contained in the General Plans of Surrounding Jurisdictions

Jurisdiction	Noise-Related Polices
San Mateo County	• Reduce transportation-related noise. • Adopt the 1995 aircraft noise exposure contours to guide land use compatibility decisions in unincorporated San Mateo County. • Develop and adopt noise/land use compatibility regulations and noise insulation requirements. • Support and encourage FAA and SFO noise reduction efforts. • Limit land uses at ends of runways. • Regulate location and height of development surrounding airports.
City of Burlingame	The Noise Element of the City's General Plan contains policy goals to reduce annoying levels of noise and to implement an airport noise surveillance program.
City of Millbrae	The Noise Element of the City's General Plan has two primary concerns: • Protecting the City's existing neighborhoods and commercial areas to provide a basis for enforcing noise standards to minimize the intrusive effects of nuisance or single-event noise sources (such as aircraft, construction noise, amplified music) on the day-to-day quality of life in Millbrae. • Assuring that new development is done appropriately by integrating noise considerations with the Land Use and Circulation Elements, and evaluating the impacts and appropriateness of new development and redevelopment with the noise environment of the City. The Noise Element also contains noise standards for new development and redevelopment projects.
City of San Bruno	The Health and Safety Element of the City's General Plan contains noise standards for areas outside of the areas affected by Airport noise. The City of San Bruno utilizes the CLUP SFO airport land use compatibility standards for land within the area exposed to 60 dB CNEL or greater.
City of South San Francisco	The City has adopted land use criteria for noise-affected areas that are consistent with the San Mateo County CLUP airport land use compatibility standards for SFO. The City has also adopted guiding policies related to noise, as follows: • Protect public health and welfare by eliminating or minimizing the effects of existing noise problems, and by preventing increased noise levels in the future. • Continue efforts to incorporate noise considerations into land use planning decisions, and guide the location and design of transportation facilities to minimize the effects of noise on adjacent land uses.

Sources: San Mateo County, California, Department of Environmental Management, Planning and Building Division, *General Plan, Policies*, November 1986; City of Burlingame, *General Plan, Noise Element*, adopted by City Council Resolution 69-75, September 15, 1975. City of Millbrae, *General Plan, Noise Element*, adopted November 24, 1998; City of San Bruno, *General Plan, Health and Safety Element*, December 2008; and City of South San Francisco, *South San Francisco General Plan*, undated, http://www.ci.ssf.ca.us/index.aspx?NID=360, accessed February 3, 2011.

Prepared by: Ricondo & Associates, Inc., February 2011.

4.2.3 Summary

The No Action alternative would not result in any construction or other changes to the Airport. The Proposed Action is consistent with the San Mateo County General Plan and zoning designations for the Airport, and would not result in any increase in aircraft noise exposure to surrounding communities when compared with the No Action alternative. Thus, neither alternative would conflict with applicable plans. A land use compatibility assurance letter from the City and County of San Francisco is included in Appendix C, stating that the CCSF remains committed to working with surrounding jurisdictions to promote compatibility between the Airport and the local communities.

4.3 Socioeconomic Impacts, Environmental Justice, and Children's Health and Safety Risks

4.3.1 Socioeconomic Impacts

In accordance with FAA Order 1050.1E, socioeconomic impacts were evaluated for each alternative to determine whether they would cause residential or business relocations, division or disruption of established communities, alteration of surface transportation patterns, disruption of orderly planned development, or appreciable change in employment.

The No Action alternative would not result in any residential or business relocations, division or disruption of established communities, alteration of surface transportation patterns, disruption of orderly planned development, or appreciable change in employment.

The proposed ATCT site is located on Airport property in an area where no existing housing has been developed or residential population is located. The Proposed Action would not result in any residential relocations, division or disruption of established communities, disruption of orderly planned development, or appreciable change in employment. Construction of the ATCT would result in a temporary increase in construction jobs, but the number of jobs is not anticipated to be significant.

4.3.2 Environmental Justice

On February 11, 1994, Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was signed requiring

> "to the greatest extent practicable and permitted by law…each federal agency shall make achieving environmental justice a part of its mission by identifying and addressing, as appropriate, disproportionately high adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations in the United States."

The Presidential Memorandum accompanying the Executive Order directed federal agencies to:

- Analyze the environmental effects (health, economic, and social) of proposed actions, including such effects on minority and low-income communities, when such analysis is required by NEPA;
- Address the significant adverse effects of any mitigation measures outlined or analyzed in an EA, environmental impact statement (EIS), or ROD on minority and low-income communities; and
- Provide opportunities for community input in the NEPA process, including identifying potential effects and mitigation measures in consultation with affected communities,

improving the accessibility of meetings, and providing access to crucial documents and notices.

The proposed ATCT site is located on Airport property in an area where no existing housing has been developed and no residential population is located. The No Action and Proposed Action alternatives would not create disproportionately high and adverse human health or environmental effects on minority and low-income populations as a result of their programs, policies, and activities.

4.3.3 Children's Health and Safety Risks

Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks,* stipulates that each federal agency "(a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks." The proposed ATCT site is located on Airport property in an area where no existing housing has been developed or residential population is located. Thus, neither the No Action nor the Proposed Action alternative would have an adverse effect on the health or safety of children.

4.4 Secondary (Induced) Impacts

Airport actions can involve the potential for secondary (or induced) impacts on surrounding communities. Examples of these impacts include shifts in patterns of population movement and growth, public service demands, and changes in business and economic activity to the extent influenced by airport development.

There would be no effect on population or public service demand associated with implementation of the No Action or Proposed Action alternative. The Proposed Action would have no impact on performance objectives of police protection, fire protection, schools, parks, or other public service facilities. The Proposed Action would not generate any increase in the number of students or number of park users. The Proposed Action would not result in additional police or fire protection services compared to existing conditions. Therefore, no impact to these public services would be anticipated.

4.5 Air Quality

The primary sources of guidance for assessing potential air quality effects are FAA Orders 1050.1E and the *Air Quality Procedures for Civilian Airports and Air Force Bases* (Airport Air Quality Handbook).[15] Typically, an emissions inventory is prepared for each reasonable alternative, including the No Action alternative. Additional analyses, including dispersion modeling or roadway intersection hot spot analyses, are not typically required if the estimated emissions of each criteria pollutant would not exceed thresholds listed in the general conformity regulations. Information presented in the Airport Air Quality Handbook can be used to determine whether an NAAQS assessment[16] should be performed for a proposed action.

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[15] U.S. Department of Transportation, Federal Aviation Administration, *Air Quality Procedures for Civilian Airports and Air Force Bases*, Report No. FAA-AEE-97-03, Washington, DC, April 1997, including the addendum, Report No. FAA-AEE-04-03, September 2004.

[16] When a Proposed Action could cause or contribute to an exceedance of the NAAQS, pollutant concentrations are estimated for criteria pollutants of interest through air dispersion modeling. The FAA's Emissions and Dispersion Modeling System (EDMS) incorporates algorithms from the U.S. EPA's AERMOD dispersion model.

4.5.1 Conformity

The CAAA require federal agencies to ensure that their actions conform to the appropriate SIP. Conformity is defined as demonstrating that a project or action conforms to the SIP's purpose of eliminating or reducing the severity and number of violations of the NAAQS, and achieving expeditious attainment of such standards. Federally funded and approved actions at airports are subject to the U.S. EPA's general conformity regulations. The U.S. EPA has published a final rule regarding general conformity determinations.[17] The final rule includes annual emissions thresholds for nonattainment areas and maintenance areas that trigger the need for a general conformity determination, and defines projects that are generally excluded from general conformity requirements.

A conformity determination is required if one of the following occurs: (1) the total direct and indirect pollutant emissions[18] resulting from a project are above *de minimis*[19] emissions threshold levels specified in the conformity regulations, or (2) pollutant emissions from the project would be regionally significant (i.e., the project would contribute 10 percent or more of the region's total emissions for a criteria pollutant). A conformity determination is not required if the differences in emissions between the proposed action and the no action alternative are below the applicable *de minimis* threshold levels. If a conformity determination is required, the regulation identifies the approaches for showing that an action/project conforms to the appropriate SIP.

4.5.2 Air Quality Analysis

The Proposed Action involves the construction and operation of a new ATCT and associated base building, as well as demolition of the existing ATCT, including associated office and mechanical space. On July 30, 2007, the FAA published a Notice in the *Federal Register* specifying projects identified by the FAA as presumed to conform ("Federal Presumed to Conform Actions under General Conformity", FR Vol. 72, No. 145). The Notice identified 15 project categories that do not modify or increase airport capacity or change the operational environment of an airport in such a way as to increase air emissions above *de minimis* thresholds. The 15th project category identified in the Notice is the "Routine Installation and Operation of Airport Navigation Aids". The Notice states that:

> The routine installation, in-kind replacement, and maintenance of navigational aids (e.g., Airport Traffic Control Towers (ATCT), Instrument Landing Systems (ILS), Approach Light Systems (ALS)) are presumed to conform because these activities will not generate emissions that exceed *de minimis* levels. Moreover, emissions generated by construction equipment and maintenance vehicles used to transport workers and equipment to communications, navigation, and surveillance (CNS) system sites are negligible considering the temporary nature of construction and maintenance activities and the limited number of vehicles involved.

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[17] U.S. Environmental Protection Agency, 40 Code of Federal Regulations Part 93, *Determining Conformity of Federal Actions to State or Federal Implementation Plans*, Subpart B, November 30, 1993, as amended.

[18] Total direct and indirect emissions are the sum of the emissions increases and decreases associated with a proposed project, or the "net" change in emissions anticipated to occur as a result of the proposed project (40 CFR 93.152).

[19] Emissions are so small as to be negligible or insignificant. If a project/action has *de minimis* emissions, a conformity determination/NAAQS assessment pursuant to the *Clean Air Act Amendments of 1990* is not required (40 CFR 93.153c).

> If the installation of new or upgraded navigational aids for improved safety and efficiency also increases the capacity of the airport or changes the operational environment of the airport, these CNS activities are not presumed to conform.

Because the relocated ATCT would not change the capacity of the Airport or operational configuration of the airfield and the proposed ATCT is reasonably similar to the existing ATCT, the project is presumed to conform and no air quality emissions modeling or inventory is required for operation of the ATCT. However, an analysis of construction-related emissions was undertaken to verify that construction of the new ATCT would not exceed *de minimis* levels.

Construction would include clearing and grading the site, building the ATCT and base building, and trenching to connect the new facilities to existing utilities. Demolition would include the destruction/dismantling and disposal of the existing ATCT and associated facilities. Construction of the new ATCT is anticipated to begin in April 2012, with final demolition of existing facilities estimated to occur in 2016.

For purposes of evaluating the potential for short-term increases in emissions associated with construction of the Proposed Action, construction-related emissions were estimated to demonstrate that *de minimis* standards for criteria air pollutants of concern would not be exceeded.[20] The California Air Resources Board's (CARB's) Urban Emissions 2007 (URBEMIS2007) model (version 9.2.4) was used to estimate the construction emissions associated with the Proposed Action. Methodologies, assumptions, and results of the air quality analysis are provided in **Appendix D**. The analysis was conducted using information provided by Airport staff (see Appendix D for specific information sources).

Table IV-3 presents the estimated construction-related emissions associated with the Proposed Action for each construction year as well as applicable *de minimis* thresholds. The URBEMIS2007 model allows for the application of several mitigation measures to reduce emissions associated with fugitive dust, construction equipment exhaust emissions, and emissions associated with architectural coating. Emissions were calculated two ways: 1) assuming that no measures to minimize air emissions would be taken and 2) assuming that the minimization measures listed below would be implemented.

- **Grading**. To minimize fugitive dust emissions related to soil disturbance, it was assumed that any exposed surfaces would be watered two times per day (reduces PM_{10} and $PM_{2.5}$ emissions by 55 percent). To minimize exhaust emissions, the use of diesel particulate filters was assumed for all off-road construction equipment (reduces PM_{10} and $PM_{2.5}$ emissions by 85 percent).
- **Trenching**. To minimize exhaust emissions, the use of diesel particulate filters was assumed for all off-road construction equipment (reduces PM_{10} and $PM_{2.5}$ emissions by 85 percent).
- **Building construction**. To minimize exhaust emissions, the use of diesel particulate filters was assumed for all off-road construction equipment (reduces PM_{10} and $PM_{2.5}$ emissions by 85 percent).

[20] Considered in its entirety, the Proposed Action would not induce or accommodate additional aircraft activity or associated ground vehicle traffic. Additionally, any emissions associated with operating the new facilities subsequent to construction were not assumed to exceed operational emissions associated with the existing facilities. Therefore, no operational emissions were estimated for purposes of this air quality analysis.

Table IV-3

Comparison of Construction Emissions to *de minimis* Thresholds – Proposed Action

Emissions by Construction Year (with and without Minimization Measures	Pollutant Emissions (tons/year)					
	Carbon Monoxide (CO)	Volatile Organic Compounds (VOCs)[1/]	Oxides of Nitrogen (NO_X)[1/]	Oxides of Sulfur (SO_X)	Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)
de minimis Threshold	100	100	100	n.a.	n.a.	100
2012						
No Minimization Measures	1.483	0.335	2.524	0.000	0.150	0.136
Minimization Measures	1.483	0.335	2.524	0.000	0.025	0.022
2013						
No Minimization Measures	2.102	0.453	3.357	0.000	0.194	0.178
Minimization Measures	2.102	0.453	3.357	0.000	0.032	0.029
2014						
No Minimization Measures	0.721	0.571	1.046	0.000	0.060	0.055
Minimization Measures	0.721	0.529	1.046	0.000	0.010	0.009
2015						
No Minimization Measures	0.406	0.079	0.596	0.000	0.072	0.037
Minimization Measures	0.406	0.079	0.596	0.000	0.047	0.014
2016						
No Minimization Measures	0.780	0.146	1.086	0.000	0.135	0.065
Minimization Measures	0.780	0.146	1.086	0.000	0.092	0.026

Notes: n.a. = not applicable. *De minimis* thresholds for SO_X and PM_{10} are not depicted or compared because San Mateo County is designated as being in attainment for these pollutants.
1/ VOCs and NO_X are ozone precursors.

Sources: Ricondo & Associates, Inc., January 2011, based on the URBEMIS2007 emissions model (version 9.2.4) and information obtained from San Francisco International Airport staff.
Prepared by: Ricondo & Associates, Inc., January 2011.

- **Architectural coating** – To reduce off-gas/evaporative emissions related to coating/painting, the use of low-VOC coatings was assumed (reduces VOC emissions by 10 percent).

- **Demolition** – To minimize exhaust emissions, the use of diesel particulate filters was assumed for all off-road construction equipment (reduces PM_{10} and $PM_{2.5}$ emissions by 85 percent).

Emissions of each pollutant of concern associated with construction activities would not exceed the *de minimis* standards in any construction year, with or without the implementation of minimization measures. Therefore, a general conformity determination for the Proposed Action is not required and the Proposed Action is presumed to be in conformance with the SIPs for the San Francisco Bay Area Air Basin.

4.6 Water Quality

In accordance with FAA Order 1050.1E, the sponsor must follow local, state, tribal, or federal ordinances and regulations to address impacts to the quality of water resources. The Clean Water Act provides the authority for the U.S. EPA to establish water quality standards, control discharges, develop waste treatment management plans and practices, prevent or minimize the loss of wetlands, protect aquifers and sensitive ecological areas such as a wetlands area, and regulate other issues concerning water quality.

FAA Order 1050.1E indicates that significant effects on water quality include the following:

- Section 1424(e) of the Safe Drinking Water Act requires consultation with the U.S. EPA if the Proposed Action has the potential to contaminate an aquifer designated by the U.S. EPA as a sole or principal source of drinking water for the area.
- If the Proposed Action would impound, divert, drain, control, or otherwise modify the waters of any stream or other body of water, the Fish and Wildlife Coordination Act applies.
- Exceedances of water quality standards and water quality problems that cannot be avoided or satisfactorily mitigated would be identified as significant impacts.

The Porter-Cologne Water Quality Control Act is the primary statute covering the quality of waters in California. The Act sets out specific water quality provisions and discharge requirements regulating the discharge of waste within any region that could affect the quality of State waters. The San Francisco Bay Regional Water Quality Control Board is the relevant board reviewing actions at SFO that may affect receiving waters. The San Francisco Bay RWQCB administers the National Pollutant Discharge Elimination System (NPDES) permit program in California, pursuant to the federal Clean Water Act.[21]

4.6.1 Storm Water Collection and Discharge

On April 1, 2002, the San Francisco Bay RWQCB issued NPDES Permit Number CA0028070 ("Industrial Permit"), which was updated on August 8, 2007. In addition to governing treated industrial wastewater discharges from the Airport's Mel Leong Treatment Plant (MLTP), this permit

[21] California Environmental Protection Agency, San Francisco Bay Regional Water Quality Control Board, *Storm Water Programs and Permits*, 2011; http://www.swrcb.ca.gov/sanfranciscobay/water_issues/programs/stormwater.shtml (accessed February 7, 2011).

also covers all of the industrial and construction storm water discharges from the Airport[22], consistent with 40 CFR Parts 122[23], 123[24], and 124[25].

In compliance with its general NPDES permit, the Airport maintains a regional Storm Water Pollution Prevention Plan (SWPPP). The permit represents a joint effort involving SFO and its tenants. The general permit requires permittees to eliminate non-storm water discharges and develop and implement an SWPPP to limit contact of potential pollutants with storm water. The Airport is responsible for amending the SWPPP periodically and whenever there is a change in construction, operation, or maintenance that affects the quality or quantity of the industrial storm water discharge from SFO.[26]

To implement effective storm water best management practices (BMP), detention basins serving four drainage areas have been engineered to collect the first flush during a storm event. The storm water from most of the APE drains to the 1.67-million-gallon-capacity South Detention Basin (see **Exhibit IV-3**). A small portion of the APE drains to the West Field Detention Basin. Most of the mobile dissolved and suspended contaminants are retained in the first flush basins with the initial storm surge. From the detention basins, the collected runoff is discharged to industrial waste pump stations and is pumped to the MLTP for treatment. The basins are closed upon reaching capacity with first flush waters. Additional site runoff that meets federal and State water quality requirements is pumped directly into San Francisco Bay. This runoff is monitored under General NPDES Permit Number CA0028070 to ensure that State water quality requirements are met.[27]

Pollutants with the greatest potential to be present in storm water runoff and groundwater at SFO are oil and grease, as well as petroleum hydrocarbons. Other potential pollutants that may occur to a lesser degree are pesticides, halogenated and nonhalogenated solvents, herbicides, and alkaline wastes. The most likely causes for these substances entering into storm water or groundwater systems are through spills or leaks, rainwater flow, and washing of aircraft and vehicles in outdoor areas with no storm water controls.[28]

All spills of petroleum products that have the potential to reach waterways and are of sufficient volume to create a visible sheen on the water must be reported to Airport management, the U.S. Coast Guard, the U.S. EPA Emergency Response Center, the California EPA Emergency Response Center, the San Francisco Bay RWQCB, and the San Mateo County Department of Environmental Health. A discharge of oil or hazardous substance is classified as a spill when the material enters a navigable waterway. A discharge that is contained and does not reach a navigable waterway is not considered a spill under California EPA reporting requirements. Minor amounts of jet fuel or oil can be released onto Airport pavement during routine aircraft or vehicle operation and maintenance.

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22 San Francisco International Airport Utilities Engineering Facilities Division, *Storm Water Pollution Prevention Plan (SWPPP) for Industrial Activities (Final Draft)*, San Francisco International Airport NPDES Permit No. CA0028070 per RWQCB Order No. R2-2007-0060, September 2010.

23 Title 40 CFR Part 122, *EPA Administered Permit Programs: The National Pollutant Discharge Elimination System*, July 1, 2010 edition.

24 Title 40 CFR Part 123, *State Program Requirements*, July 1, 2010 edition.

25 Title 40 CFR Part 124, *Procedures for Decision Making*, July 1, 2010 edition.

26 San Francisco International Airport Utilities Engineering Facilities Division, *Storm Water Pollution Prevention Plan (SWPPP) for Industrial Activities (Final Draft)*, San Francisco International Airport NPDES Permit No. CA0028070 per RWQCB Order No. R2-2007-0060, September 2010.

27 U.S. Department of Transportation, Federal Aviation Administration, *Environmental Assessment, Volume 1 – Airport Master Plan Improvements, San Francisco International Airport,* October 1998.

28 U.S. Department of Transportation, Federal Aviation Administration, *Final Environmental Assessment, Volume 1 – Airport Master Plan Improvements, San Francisco International Airport,* October 1998.

LEGEND

- Storm Drains
- Catch Basins
- Manholes
- Pump Station
- Flow Direction
- Drains to West Field Detention Basin, Excess Drains to DPS 2 (E004)
- Drains to MOC Detention Basin, Excess Drains to DPS 2 (E004)
- Drains to South Detention Basin, Excess Drains to DPS 1 (E003)
- Drains to MLTP
- Drains to Outfalls E008 & E009
- Drains to DPS 1-C (E007)
- Drains to DPS 1-B (E006)
- Drains to DPS 1-A (E005)
- Drains to North Field Detention Basin which Discharges to Outfall E013
- Drains to Outfall E010
- Drains to DPS 1 (E003)
- Drains to East Detention Basin, Excess Drains to DPS 2 (E004)
- Drains to North Slough - MOC (Under separate permit to UAL MOC)
- Drains to West of U.S. Route 101 Wetland
- U.S. Coast Guard Area Drains to DPS 2 (E004)
- Area of Potential Effect

DPS = Drainage Pump Station
MLTP = Mel Long Treatment Plant
UAL = United Airlines

Source: SFO Environmental Services, *Annual Industrial Stormwate*
Prepared by: Ricondo & Associates, Inc., March 2011.

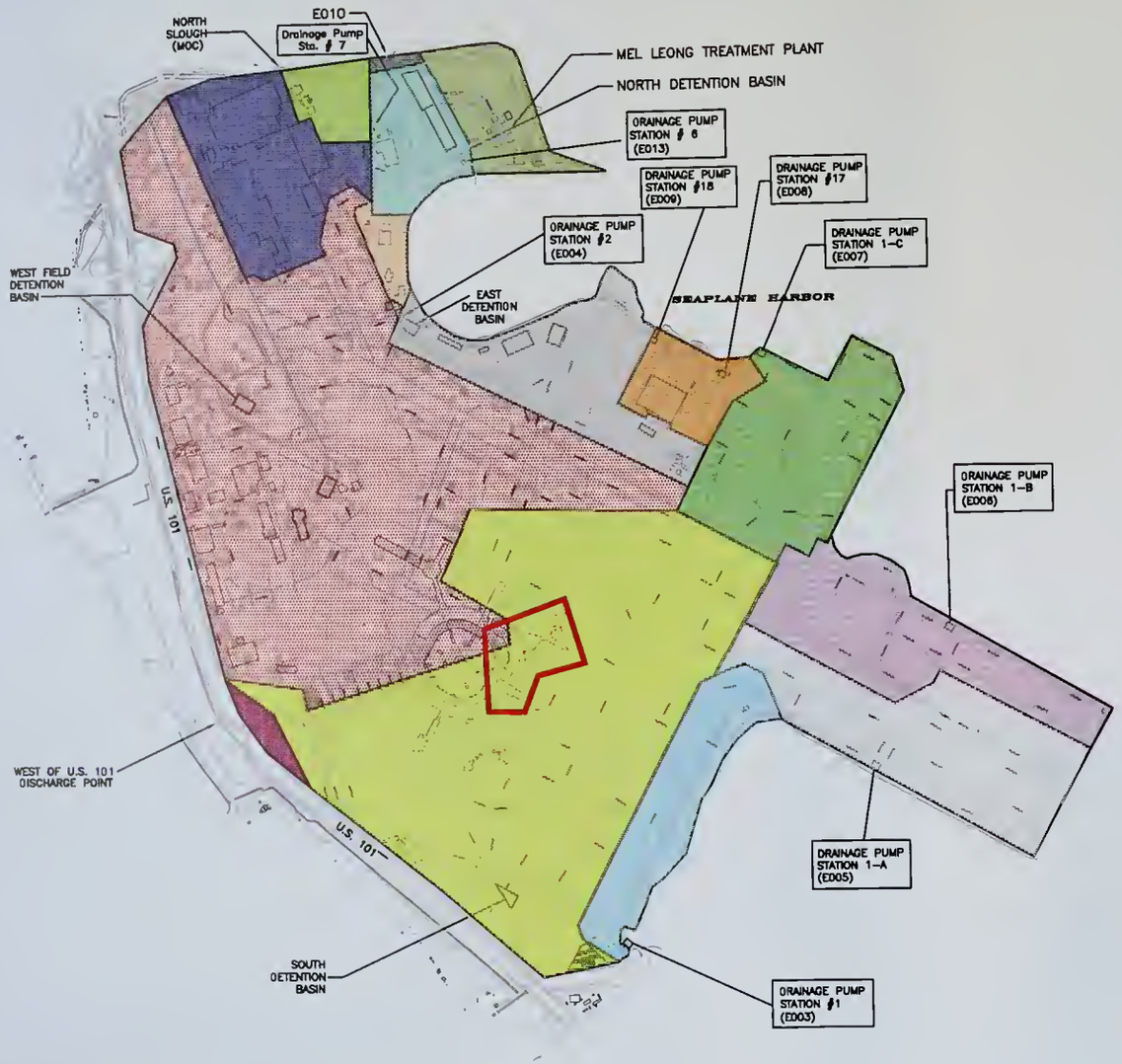
Exhibit IV-3

0 2000 ft.

north

nd Storm Water Discharge Points

Drawing: Z:\SFO\ATCT EA\AutoCAD\Fig IV-3 Drainage Areas and Storm Water Dischar



LEGEND

- Storm Drains
- Catch Basins
- Manholes
- Pump Station
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- Drains to South Detention Basin, Excess Drains to DPS 1 (E003)
- Drains to MLTP
- Drains to Outfalls E008 & E009
- Drains to DPS 1-C (E007)
- Drains to DPS 1-B (E006)
- Drains to DPS 1-A (E005)
- Drains to North Field Detention Basin which Discherges to Outfall E013
- Drains to Outfall E010
- Drains to DPS 1 (E003)
- Drains to East Detention Basin, Excess Drains to DPS 2 (E004)
- Drains to North Slough - MOC (Under seperate permit to UAL MOC)
- Drains to West of U.S. Route 101 Wetland
- U.S. Coast Guard Area Drains to DPS 2 (E004)
- Area of Potential Effect

DPS = Drainage Pump Station
MLTP = Mel Long Treatment Plant
UAL = United Airlines

Source: SFO Environmental Services, *Annual Industrial Stormwater Pollution Plan Report,* September 2006; Ricondo & Associates, Inc. (Area of Potential Effect), March 2011.
Prepared by: Ricondo & Associates, Inc., March 2011.

Exhibit IV-3

0 2000 ft.
north

Drainage Areas and Storm Water Discharge Points

Drawing: Z:\SFO\ATCT EA\AutoCAD\Fig IV-3 Drainage Areas and Storm Water Discharge Points.dwg, Layout: 11x17, Apr 06, 2011, 9:48am

When such a release does occur, the jet fuel or oil is contained, then the fuel is collected with absorbent material and classified as hazardous waste. These discharges do not reach navigable waterways.

As part of the SWPPP, BMPs are in place at SFO to prevent or minimize the possibility of pollutants reaching groundwater or the San Francisco Bay. Airport employees responsible for implementing elements of the SWPPP are trained to carry out their delegated responsibilities. The Airport's Storm Water Program Manager has primary responsibility for implementing the SWPPP for the Airport. Tenants who discharge to the Airport's storm water collection system also have responsibility for compliance with storm water requirements and are required to adopt BMPs to achieve compliance with the Airport's SWPPP.[29]

A Notice of Intent (NOI) of the Proposed Action will be sent to the San Francisco Bay RWQCB before construction activities begin. The BMPs outlined in the SWPPP will be implemented to limit contact of potential pollutants with storm water.

4.6.2 Groundwater Quality

In March 2009, Environmental Science Associates completed a Phase I Environmental Site Assessment (Phase I ESA), environmental due diligence audit for the Proposed Action at SFO.[30] In February 2011, the March 2009 Phase I ESA was updated.[31] The findings, conclusions, and recommendations presented in the March 2009 Phase I ESA for the Proposed Action were verified as still relevant.

The Phase I ESA identified the presence of recognized environmental conditions, as defined in American Society for Testing and Materials (ASTM) Standard E1527-05, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*. These recognized environmental conditions result from past releases of petroleum products, typically jet fuel, from an underground fuel pipeline and hydrant system into soil and groundwater in the vicinity of Courtyard 2, the Proposed Action site. **Exhibit IV-4** shows the existing fuel pipelines in this area of the Airport.

Exhibit IV-5 shows the extent of the petroleum hydrocarbon contamination within the soils in the general vicinity of the APE and **Exhibit IV-6** shows the groundwater petroleum-hydrocarbon plumes in the same area. Because contaminants appear to be associated with the location of the fuel pipelines, lower concentrations of hydrocarbons in soil and groundwater would be expected at the proposed ATCT location than in areas adjacent to the fuel pipelines.[32]

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[29] San Francisco International Airport Utilities Engineering Facilities Division, *Storm Water Pollution Prevention Plan (SWPPP) for Industrial Activities (Final Draft)*, San Francisco International Airport NPDES Permit No CA0028070 per RWQCB Order No. R2-2007-0060, September 2010.

[30] Environmental Science Associates, *Revised Phase I Environmental Site Assessment, San Francisco International Airport, Airport Traffic Control Tower Relocation Project*, March 2009.

[31] AGS, Inc., *Update of the March 2009 Revised Phase I Environmental Site Assessment, San Francisco International Airport, Airport Traffic Control Tower Relocation Project*, February 2011.

[32] Environmental Science Associates, *Revised Phase I Environmental Site Assessment, San Francisco International Airport, Airport Traffic Control Tower Relocation Project*, March 2009.

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Legend

- AF — Aviation Fuel Pipeline
- Approximate Proposed Location of ATCT
- (XX) Gate Number

ATCT = Airport Traffic Control Tower

Sources: SFO Environmental Services, 2009; Environmental Science Associates, *San Francisco International Airport, Airport Traffic Control Tower Relocation Project, Revised Phase 1 Environmental Site Assessment*, March 2009.
Prepared by: Ricondo & Associates, Inc., February 2011

Exhibit IV-4

Not to Scale

north

Proposed ATCT Location and Existing Fuel Pipelines

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- Approximate Extent of Total Petroleum Hydrocarbons in Soil Exceeding 10 parts per million
- Approximate Proposed Location of ATCT
- (XX) Gate Number

ATCT = Airport Traffic Control Tower

Note: Plume boundaries may not reflect current conditions.

Sources: SFO Environmental Services, 2009; Environmental Science Associates, *San Francisco International Airport, Airport Traffic Control Tower Relocation Project, Revised Phase 1 Environmental Site Assessment*, March 2009.
Prepared by: Ricondo & Associates, Inc., February 2011

Exhibit IV-5

Not to Scale

north

Proposed ATCT Location and Total Petroleum Hydrocarbon Plume Boundaries in Soil

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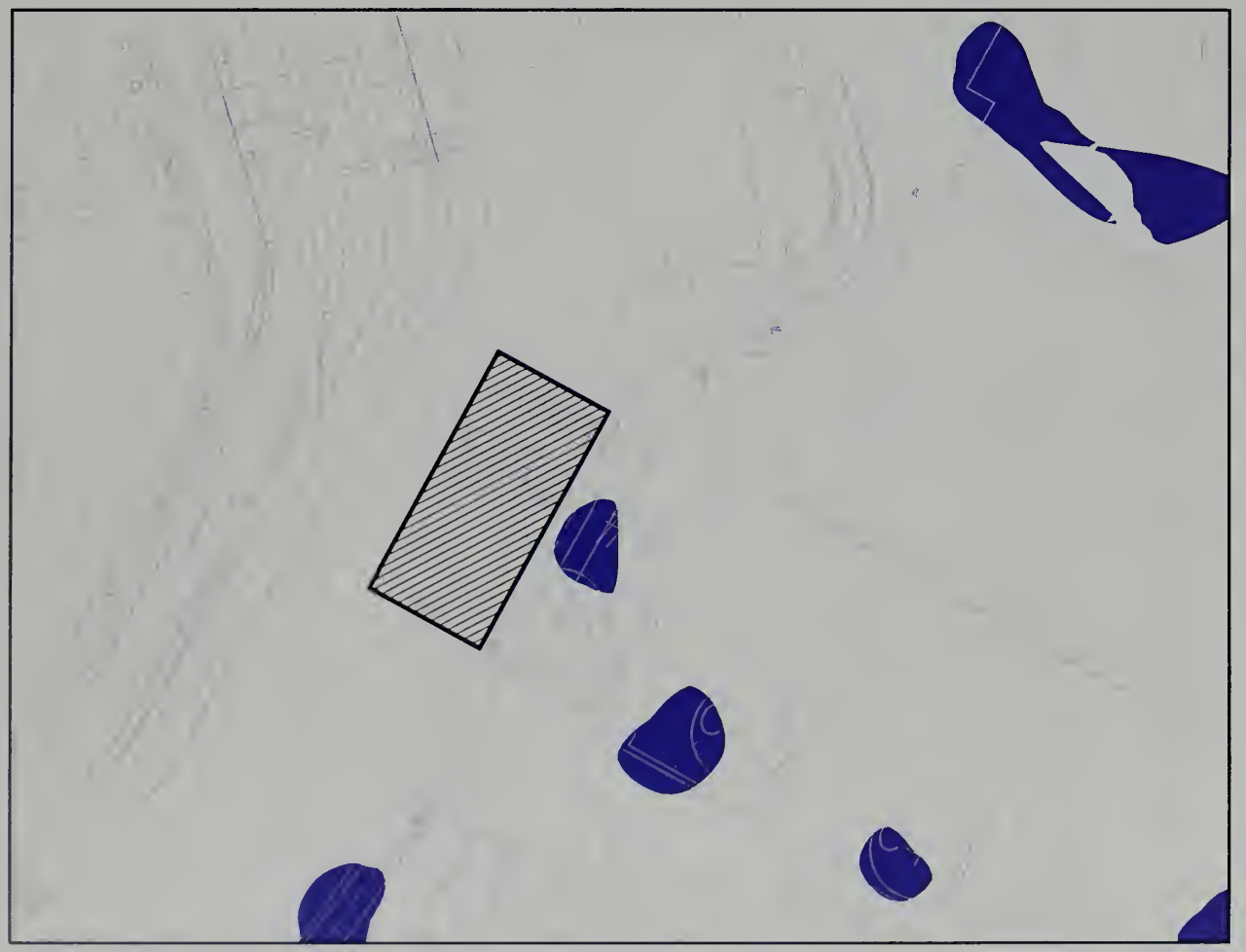

Legend

- Approximate Extent of Total Petroleum Hydrocarbons in Groundwater Exceeding 1 parts per million
- Approximate Proposed Location of ATCT
- (XX) Gate Number

ATCT = Airport Traffic Control Tower

Note: Plume boundaries may not reflect current conditions

Sources: SFO Environmental Services, 2009; Environmental Science Associates, *San Francisco International Airport, Airport Traffic Control Tower Relocation Project, Revised Phase 1 Environmental Site Assessment*, March 2009.
Prepared by: Ricondo & Associates, Inc., February 2011

Exhibit IV-6

Not to Scale

north

Proposed ATCT Location and Total Petroleum Hydrocarbon Plume Boundaries in Groundwater

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The San Francisco Bay RWQCB, the regulatory agency overseeing soil and groundwater cleanup at SFO, has established cleanup standards (Tier 1 standards) that allow for various levels of contaminants to remain in place based on risk assessment criteria. The San Francisco Bay RWQCB adopted Site Cleanup Requirements Order 99-045 in June 1999, which provides guidelines for the investigation, characterization, and remediation or in-place management of contaminants in soil and groundwater at SFO.

A multiphase extraction program of groundwater, free product, and soil vapors has occurred since 1998 at Boarding Areas B and C in the vicinity of Courtyard 2, which resulted in the removal of all measurable free product by December 2009. As of November 2009, only two monitoring wells showed groundwater concentrations (of petroleum hydrocarbons) exceeding the Tier 1 cleanup standards. These wells represent small confined pockets of groundwater in the backfill along fuel hydrant lines. The conclusions of a 2009 semi-annual monitoring report stated that the remediation at Boarding Areas B and C is largely complete.[33]

Deeper groundwater is protected by bay mud of varying thicknesses. Among the conclusions and recommendations of the Phase I ESA are the following:[34]

- The ATCT location would be subject to the cleanup standards established for the Human Health Protection Zone, as mandated by the San Francisco RWQCB. Typical site remediation might include excavation and offsite disposal of hydrocarbon-impacted soil, and possibly extraction and treatment of groundwater for dewatering during construction, as was performed for construction of the new International Terminal.
- Soil and groundwater sampling would be performed prior to construction to evaluate the appropriate level of remediation required by RWQCB Order 99-045, if any, and appropriate health and safety procedures and protocols for construction workers.

Management of dewatering activities is set forth in the latest SFO SWPPP, which defines proper sampling, profiling, and disposal.[35]

4.6.3 Analysis of Potential Effects

No impacts to water quality would occur under the No Action alternative other than those already posed by existing Airport operations. Airport management would continue to implement the SWPPP and comply with San Francisco Bay RWQCB Order 99-045 for the subsurface soil and groundwater investigation, cleanup, and monitoring.

The aquifer at SFO is not designated as a potential source of drinking water.[36] The Proposed Action would not affect any sole or principal source of drinking water aquifers. Therefore, consultation with the U.S. EPA does not apply to the Proposed Action. The Proposed Action would not divert, drain,

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33 Environmental Cost Management Inc., *2009 Second Semi-Annual Groundwater Monitoring, System Operations, and Soil Vapor Monitoring Report, Delta Airlines, Inc. Boarding Areas B and C, San Francisco International Airport*, June 10, 2010.

34 Environmental Science Associates, *Revised Phase I Environmental Assessment, San Francisco International Airport, Airport Traffic Control Tower Relocation Project*, March 2009.

35 San Francisco International Airport Utilities Engineering Facilities Division, *Storm Water Pollution Prevention Plan (SWPPP) for Industrial Activities (Final Draft)*, San Francisco International Airport NPDES Permit No CA0028070 per RWQCB Order No. R2-2007-0060, September 2010.

36 U.S. Environmental Protection Agency, *Designated Sole Source Aquifers in Region 9 Arizona, California, Hawaii, Nevada, Guam, and American Samoa*, 2008; http://www.epa.gov/safewater/sourcewater/pubs/qrg_ssamap_reg9.pdf (accessed January 21, 2011).

or otherwise modify the waters of any stream or other body of water. Therefore, the Fish and Wildlife Coordination Act does not apply.

With implementation of SWPPP BMPs, compliance with San Francisco Bay RWQCB Order 99-045 in implementing soil cleanup and dewatering, and adherence to the NPDES permit requirements, projected increases in storm water runoff, transportation, and construction activities under the Proposed Action would not significantly affect surface water or groundwater quality or discharge at SFO (see Section 4.16 for more discussion on potential construction effects). The Proposed Action is not expected to significantly increase the quantity or quality of surface water runoff and would not require modifications to existing BMPs or water management programs. Therefore, water quality effects of the Proposed Action are considered less than significant.

4.6.4 Minimization Measures

Measures that will need to be taken during construction are in place for handling contaminated soil and groundwater and for the protection of workers, public, and the environment, including:

- Sampling and analysis of the excavated soil and encountered groundwater.
- Complying with San Francisco Bay RWQCB Order 99-045, which specifies measures to protect workers and the public from exposure to hazards, and provides for site cleanup in accordance with appropriate regulatory guidance.
- Preparing a Health and Safety Plan and following Occupational Safety and Health Administration (OSHA) safety measures.
- Complying with the SWPPP.
- Use of BMPs, such as covering soil during rainy days and avoiding concrete wash release into storm drains.

If dewatering is required, groundwater testing for petroleum hydrocarbons would be performed before it commences. Treatment would be applied, in consultation with the San Francisco Bay RWQCB and/or wastewater treatment plant operators, to ensure that all discharges meet applicable requirements.

4.7 Wetlands

Executive Order 11990, *Protection of Wetlands*, requires federal agencies to ensure that their actions minimize the destruction, loss, or degradation of wetlands to the fullest extent practicable during the planning, construction, funding, and operation of transportation facilities and projects. No wetlands exist within the APE, but they are present within the Study Area. Potential effects to water quality are discussed in Section 4.6 and effects from construction activities are discussed in Section 4.16, but no effects to wetlands are anticipated with implementation of proper storm water controls. Therefore, no impacts to wetlands would occur under either the No Action or Proposed Action alternative.

4.8 Floodplains

Executive Order 11988, *Floodplains*, directs federal agencies to take action to reduce the risk of flood loss; minimize the impact of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains. The proposed ATCT site is not located within a 100-year floodplain (see Exhibit III-4) nor would construction of the ATCT affect any existing floodplains; therefore, no impacts to floodplains would occur under either the No Action or Proposed Action alternative.

4.9 Coastal Resources

The BCDC is the agency responsible for implementing the provisions of the Coastal Zone Management Act under the State of California's Coastal Zone Management Program. The BCDC has jurisdiction over all tidal areas of the San Francisco Bay and a shoreline band extending 100 feet inland from the mean high-tide line. As stated in Section 3.4.5, the APE does not fall within the BCDC's jurisdiction and is, thus, not located within a coastal area protected by a coastal zone management program. Potential effects to water quality are discussed in Section 4.6 and effects from construction are discussed in Section 4.16. Although portions of the Study Area contain areas under BCDC jurisdiction, no effects to coastal resources are anticipated with implementation of proper storm water controls. Therefore, no impacts to coastal resources would occur under either the No Action or Proposed Action alternative.

4.10 Fish, Wildlife, and Plants

In accordance with FAA Order 1050.1E, potential effects to biological resources including fish, wildlife, and plants, and to species protected under the federal Endangered Species Act were evaluated. The Endangered Species Act of 1973, as amended (50 CFR Part 402), requires each federal agency to confer with the U.S. Fish & Wildlife Service (FWS), "on any action which is likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat."

The proposed ATCT site is located in the middle of the Airport in an area that has been previously developed and highly disturbed. There are no known local, regional, or State recognized candidate, sensitive, or special status species (special status species) occurring at the proposed ATCT site or within the APE. Habitat for the federally threatened California red-legged frog and the federally endangered San Francisco garter snake exists on Airport property west of U.S. Highway 101, and known occurrences of the California clapper rail exists along the shore of San Francisco Bay. However, no habitat for these species exists within the APE, nor is it likely that these species would use the APE for migration to other habitat areas.

The FAA has determined that the Proposed Action and No Action alternatives would not affect any federally listed threatened or endangered species or designated critical habitat. The FAA has based this determination on the fact that the proposed ATCT site and immediate surrounding areas have been paved for years and do not provide any natural habitat or food source.

4.11 Department of Transportation Act, Section 4(f)/303(c) Properties

As stated in Chapter III, Section 4(f) of the U.S. Department of Transportation Act of 1966 prohibits the use of publicly owned parks or recreation areas, wildlife or waterfowl refuges, or significant historic sites for transportation purposes unless there is no feasible and prudent alternative to the use of such land, and unless the action includes all possible planning to minimize harm resulting from such use.

The Proposed Action is located in an area adjacent to Airport passenger terminals, airfield aprons, and the passenger terminal roadway. The nearest park to the proposed ATCT site is Marina Vista Park, which is located across U.S. 101 approximately 0.75 mile southwest of the proposed ATCT site. The Proposed Action would not include, generate demand for, or affect any existing neighborhood parks, regional parks, or other recreational facilities.

Neither the No Action nor the Proposed Action alternative would use or affect any publicly owned park or recreation area, wildlife or waterfowl refuge, or significant historic site. The FAA has initiated consultation with the State Historic Preservation Office (SHPO) to review the FAA's

finding that no historic resources would be affected by the Proposed Action (see **Appendix E**). Therefore, neither the Proposed Action nor the No Action alternative would result in a direct or constructive use of any property protected by DOT Act, Section 4(f). Sections 4.12 and 4.13 of this EA discuss potential effects on historic sites, including the U.S. Coast Guard Air Station.

4.12 Historic, Archaeological, Architectural, and Cultural Resources

Section 106 of the National Historic Preservation Act requires federal agencies to consider the effects of their actions on properties included, or eligible for inclusion, in the National Register of Historic Places. Compliance requires consultation with the Advisory Council on Historic Preservation, the State Historic Preservation Officer, and/or the Tribal Historic Preservation Officer.

An evaluation of historical significance requires a reference context to place the resource in its proper and relative place within historical periods and architectural trends. For the purposes of the existing ATCT, the historical context was identified and the property's significance evaluated according to standard criteria established by the Advisory Council on Historic Preservation.

As discussed in Section 3.6, several cultural resources surveys have been completed for the Airport over the past 20 years. Terminal 2 has not been found eligible for listing in the National Register of Historic Places (NRHP) under any of these surveys. The existing ATCT was constructed in 1984, 27 years ago. A historical, archaeological, architectural, and cultural resources report[37] was undertaken to evaluate the potential for the Proposed Action to affect historic resources in compliance with Section 106 of the National Historic Preservation Act.

The existing ATCT, which was built in the early 1980s, is not eligible for the NRHP because it is less than 50 years old, does not meet the National Register criteria for Evaluation Criteria Consideration G, and has not been found to be a contributor to a historic district. The original 1954 ATCT does not exhibit a level of significance or historic integrity that would make it eligible for listing on the National Register. The U.S. Coast Guard Air Station, determined to be eligible as a National Register Historic District, is located approximately 1.07 miles from the existing ATCT. The proposed ATCT would be located approximately 1.12 miles southeast of the U.S. Coast Guard Air Station. The Proposed Action would not affect, either directly or indirectly, the U.S. Coast Guard Air Station (see Section 4.13 of this EA for a discussion of potential visual effects).

The entire proposed ATCT site is highly disturbed and has been previously graded and paved. No historic resources are known to exist within the APE (see Exhibit III-1). The FAA has determined that there are no historic properties within the APE for the proposed undertaking. Because the FAA has determined there are no historic properties listed or eligible for listing on the National Register of Historic Place, and no archaeological sites have been identified within the APE, the FAA finds that the proposed undertaking will not affect any properties listed or eligible for listing on the National Register of Historic Places under 36 CFR Part 800.4(d)(1). Consultation with the California State Historic Preservation Officer seeking concurrence with FAA's determination of the Area of Potential Effect and Findings was initiated by letter dated March 29, 2011 (see Appendix E).

An informational letter was sent to the California Native American Heritage Commission (CNAHC) on January 10, 2011, informing the Commission that the CCSF is in the process of developing this EA, and plan to release the draft EA for public and agency review in April 2011. The notice requested a search of the CNAHC records for any Native American traditional cultural properties or land interests in the vicinity of the Airport. The CNAHC responded that no records of Native

[37] CIRCA: Historic Property Development, *Relocation of the Airport Traffic Control Tower at San Francisco International Airport, Historical, Archaeological, Architectural, and Cultural Resources*, February 2011.

American cultural resources in the immediate project area exist within their sacred lands file (see Appendix E). The CNAHC recommended that the FAA contact several Native American individuals and organizations that may have knowledge of cultural resources in the project area. On March 28, 2011, the FAA provided detailed information about the Area of Potential Effect and the proposed undertaking via U.S. mail to the tribal contacts listed in Appendix E. A sample letter is also included in Appendix E.

Neither the No Action nor the Proposed Action alternative would have a direct or indirect effect on any known historic, archaeological, architectural, or cultural resources. However, because the Proposed Action would require excavation below ground surface for the piles to support the ATCT, minimization measures would be implemented in case of accidental discoveries during soil disturbance activities. The CCSF has instituted minimization measures to avoid any potential adverse effect on accidentally discovered buried or submerged historical resources. The CCSF Planning Department requires that an archaeological resources "ALERT" sheet be distributed to the prime contractor, to any project subcontractor (including demolition, excavation, grading, foundation, pile driving firms), or utilities firm involved in soil disturbing activities on Airport property. Prior to any soil disturbing activities being undertaken, each contractor is responsible for ensuring that the "ALERT" sheet is circulated to all field personnel, including machine operators, field crews, pile drivers, supervisory personnel, etc. In the event that cultural or archaeological resources are encountered, all work within the vicinity of the find would stop until a qualified archaeologist can assess the find and make recommendations.

4.13 Light Emissions and Visual Impacts

Light emissions and visual impacts are considered to determine whether any lighting associated with an alternative would create an annoyance among residents in the vicinity or interfere with their typical activities, or whether an alternative would visually contrast with the existing environment significantly enough to be objectionable.

4.13.1 Methodology and Approach

The term "aesthetics" typically refers to the perceived visual impression of an area, such as of a scenic view, open space, or architectural interest. The aesthetic value of an area is a measure of its visual character and visual quality combined with viewer response.[38] This combination may be affected by the components of a project (e.g., buildings constructed at a height that obstructs views, hillsides cut and graded, open space changed to an urban setting), as well as changing elements, such as light, weather, and the length and frequency of viewer exposure to the setting. Aesthetic impacts are thus defined as changes in viewer response as a result of project construction and operation.

4.13.1.1 Visual Character

Visual character is the appearance of the physical form of the landscape, composed of natural and human-made elements, including topography, water, vegetation, structures, roads, infrastructure, and utilities, and the relationships of these elements in terms of form, line, color, and texture.

4.13.1.2 Visual Quality

Visual quality is evaluated based on the relative degree of vividness, intactness, and unity as modified by its visual sensitivity.[39]

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[38] Federal Highway Administration, *Visual Impact Assessment for Highway Projects* (FHWA-HI-88-054), 1988.
[39] Federal Highway Administration, *Visual Impact Assessment for Highway Projects* (FHWA-HI-88-054), 1988.

- *Vividness* is the visual power or memorability of landscape components as they combine in striking or distinctive visual patterns.
- *Intactness* is the visual integrity of the natural and human-built landscape and its freedom from encroaching elements; this factor can be present in well-maintained urban and rural landscapes, as well as natural settings.
- *Unity* is the visual coherence and compositional harmony of the landscape considered as a whole; it frequently attests to the careful design of individual components in the human-made landscape.

High-quality views are highly vivid, relatively intact, and exhibit a high degree of visual unity. Low-quality views lack vividness, are not visually intact, and possess a low degree of visual unity.

4.13.1.3 Viewer Response

Viewer response is the psychological reaction of a person to visible changes in the viewshed. A viewshed is defined as all of the surface area visible from a particular location (e.g., an overlook) or sequence of locations (e.g., roadway or trail).[40] Generally, the closer a resource is to the viewer, the more dominant it is and the greater its importance to the viewer. Although distance zones in a viewshed may vary between different geographic regions and types of terrain, the standard foreground zone is 0.25–0.5 mile from the viewer, the middleground zone is considered to be from the foreground zone to 3–5 miles from the viewer, and the background zone is considered to be from the middleground zone to infinity.[41] The measure of the quality of a view must be tempered with the overall sensitivity of the viewer and viewer response. Viewer sensitivity is dependent on the number and type of viewers and the frequency (e.g., daily or seasonally) and duration (i.e., how long a scene is viewed) of views. Visual sensitivity is also modified by viewer activity, awareness, and visual expectations in relation to the number of viewers and the viewing duration.

4.13.1.4 Aesthetic Assessment Process

The concepts presented above are combined in a visual impact assessment process that involves identification of the following:

- Visual character and quality of the project area;
- Relevant policies and concerns for the protection of visual resources;
- General visibility of the project area and site using descriptions, photographs, and photo simulations; and
- Viewer response and potential impacts.

4.13.2 Analysis of Potential Visual Effects

The short-term effects (those occurring during construction) and long-term effects (those occurring from the built project) that could result from the Proposed Action are discussed below. Under the No Action alternative, there would be no visual effects. The analysis of visual effects of the Proposed Action is based on:

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[40] Federal Highway Administration, *Visual Impact Assessment for Highway Projects* (FHWA-HI-88-054), 1988.

[41] G. R. Jones, J. Jones, B.A. Gray, B. Parker, J.C. Coe, J.B. Burnham, and N.M. Geitner, "A Method for the Quantification of Aesthetic Values for Environmental Decision Making," 1975. *Nuclear Technology* 25(4): pp. 682-713.

- Direct field observation from vantage points, including neighboring communities, developed areas, and roadways;[42]
- Photographic documentation of key views of and from the project site;
- Review of project design drawings;
- Review of the project with regard to compliance with federal, State, and local ordinances and regulations pertaining to visual resources; and
- Analysis of photo simulations used to depict the Proposed Action.

Appendix F contains photographs showing views from various vantage points surrounding the Airport, as well as a discussion of different viewer groups and their anticipated responses to changes in viewsheds. Representative photographs for vantages of the Study Area were chosen to depict existing conditions and the Proposed Action, which includes removal of the existing 195-foot-tall ATCT and administrative offices, including Levels 4 through 11 of Terminal 2 and the proposed 228-foot-tall ATCT at Courtyard 2. Note that during the time of the analysis (January 2011), the proposed ATCT was still undergoing design refinement and the simulation reflects the most recent concept available at that time.

Effects that would occur as a result of the Proposed Action include temporary changes in views as a result of construction, potential glare and light impacts, and visual effects resulting from the relocation and height increase of the proposed ATCT and demolition of the existing ATCT and administrative offices.

4.13.2.1 Construction Effects

Construction of the Proposed Action would create temporary changes in views of the Study Area. The proposed ATCT would take approximately three years to construct; demolition of the existing ATCT and Airport administrative offices would follow operation of the new ATCT and take approximately 17 months. Demolition of the existing ATCT would not commence until after the FAA installs and tests equipment in the relocated ATCT, a process expected to take approximately 14 months. Visual elements related to construction would be visible from both waterfront and inland vantages.

Ground- and lower-level views of construction would primarily be visible from certain waterfront vantages and vantages within the terminal complex. From these locations, it is more likely that viewers would see considerable heavy equipment, construction activities, and associated vehicles, including bulldozers, cranes, front-end loaders, and trucks. High-intensity ground lighting for nighttime construction, scaffolding, and safety and directional signage would also be a visible element. However, construction associated with the current renovation of Terminal 2 (and subsequent renovation of Terminal 1) makes construction an existing visual feature at SFO. In addition, high-intensity ground lighting would not adversely affect viewers because it is an existing feature. The number of viewers at the Airport and from the waterfront decreases during the night because activity at the Airport decreases at night; the numbers of boats on the Bay are substantially reduced; parks and industrial and commercial areas close for the night; and people in hotels tend to close the curtains, focus on activities within their rooms, and then go to sleep.

As described in Appendix F, there are not many inland views of the Study Area, and where views do exist, they include only the upper levels of the existing ATCT. Ground-level views of SFO are not

[42] Field observations were conducted by an ICF International landscape architect on December 1, 2010, and January 14, 2011.

available from public roadways, parks, and residential and commercial areas located inland. Therefore, only construction activities taking place at higher elevations would be visible over existing development and vegetation, and high-intensity ground lighting would not be visible. Elements such as scaffolding and cranes would be visible along with the construction of the upper levels of the proposed ATCT and the demolition of the upper levels of the existing ATCT and Terminal 2. However, construction activities are currently taking place at Terminal 2 and scaffolding and cranes are an existing visual feature associated with the Study Area and the existing ATCT. Furthermore, construction is temporary in nature and would not result in adverse long-term visual effects. All viewer groups in the Study Area and vicinity would be accustomed to seeing construction activities and equipment, and their sensitivity to such views would be low.

4.13.2.2 Operational Effects

Once the proposed ATCT has been constructed, the views of the Study Area from waterfront and inland locations would change. The proposed ATCT would be in a different location and would be taller than the existing ATCT. Relocation of the ATCT would not greatly affect the existing visual character of views because the existing ATCT is a current visual element. Therefore, the proposed ATCT would not add a new or unfamiliar visual element to viewsheds. The height increase and removal of the existing ATCT and Airport administration offices would be the greatest factors affecting the visual character of the APE.

From most waterfront and inland vantages where the existing ATCT is already visible, the proposed ATCT would likely be only slightly more visible because of the shifted location and height increase, as shown on **Exhibit IV-7**. The exhibit illustrates that the proposed ATCT would be slightly more visible because the shift in location and height change prevent the Tower from blending with the views of the hills behind it. Note that during the time of the analysis (January 2011), the proposed ATCT was still undergoing design refinement and the simulation reflects the most recent concept available at that time.

As previously mentioned, the proposed ATCT would not adversely affect the visual character of the area, because a Tower is part of the existing visual environment. The height increase would not be tall enough to make the proposed ATCT appear to be out of visual context compared with existing visual conditions. In addition, because the existing ATCT and administrative offices would be removed, the bulk and mass of the old structures would no longer be present and the proposed Tower would appear to be more streamlined than the existing Tower. This would be beneficial by helping to open up views of the hills from the Airport and the waterfront and in creating a more continuous and lower building profile of development along the waterfront. From other vantages, the location shift and height increase would be less noticeable, as shown on **Exhibit IV-8**. Similar to changes in views from the Bay Trail, views from the historic U.S. Coast Guard Air Station would be slightly improved with the proposed ATCT because it is less bulky than the existing ATCT and administrative offices, which would be removed.

The height increase may also allow visibility of the proposed ATCT from certain inland vantages where the existing ATCT is not currently visible, or the shifted location may cause the ATCT to not be visible from other inland vantages where intervening vegetation, buildings, and infrastructure would screen the Tower. If the proposed ATCT is visible in new locations where views did not previously exist, it is likely that only the upper portions of the Tower would be visible, similar to most existing views.

Existing view from the Bay Trail, 1.06 miles southeast of the existing airport traffic control tower.

Simulated view of proposed airport traffic control tower from the same location.

Source: ICF International, 2010 and 2011.
Prepared by: ICF International, February 2011.

Exhibit IV-7

Existing and Simulated Views of Proposed Airport Traffic Control Tower from the Bay Trail

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Existing view from the U.S. Coast Guard Station overflow parking lot, 1 mile north-northwest of the existing airport traffic control tower.

Simulated view of proposed airport traffic control tower from the same location.

Source: ICF International, 2011.
Prepared by: ICF International, February 2011.

Exhibit IV-8

Existing and Simulated Views of Proposed Airport Traffic Control Tower from the U.S. Coast Guard Station

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Views of the proposed ATCT from the State scenic highway, I-280, and the Juan Bautista de Anza National Historic Trail (i.e., El Camino Real) would generally not be visible because of development, vegetation, and sound barriers. Where views do exist, they would be fleeting and visual changes would not be perceptible as roadway travelers pass quickly by the gaps in vegetation or development.

Views of the proposed ATCT from SFO itself would not be noticeable because SFO viewers are familiar with features and structures associated with airports, most passengers would not know that the Tower has been relocated, and those dropping off or picking up passengers would not be concerned or focused on the Tower.

The Proposed Action would not increase the amount of nighttime lighting within the APE and affecting the Study Area. The proposed ATCT would have similar lighting to the existing ATCT; lighting levels would remain consistent. In addition, removal of the administrative office levels may reduce the amount of perceived nighttime lighting because this light source would no longer exist. Daytime and nighttime glare may result from the proposed ATCT if the Tower is white or very light in color or has a substantial amount of reflective surfaces, such as windows or high gloss paints. In addition, the use of white or light colors would draw attention to the structure and make it stand out more against its surroundings.

Generally, the Proposed Action would create subtle changes to the existing visual environment. These changes would not introduce a new or unfamiliar visual element and would be in keeping with the existing visual character of the area. While viewer sensitivity ranges from moderately high to low (see Appendix F), most views would only be slightly affected and would not be expected to have an adverse reaction to visual changes resulting from the proposed ATCT. In addition, the Airport and its related buildings, along with changes to the SFO complex through improvements made over time, are familiar visual elements in the project vicinity. With appropriate mitigation, no adverse visual impacts would result from the Proposed Action. Furthermore, because there would be no adverse visual effects, the Proposed Action would comply with federal, State, and local regulations pertaining to the protection of visual resources.

Use of similar building materials and colors to those found nearby would aid in helping the proposed ATCT blend with its local surroundings. The use of white or very light colored materials or paints should be avoided because they would cause glare and draw focus to the structure. The objective should be to reduce the appearance of the wall surface and structure and ensure visual compatibility with the surrounding environment. Walls should have low-sheen and nonreflective surface materials to reduce the potential for glare. The use of smooth trowelled surfaces and glossy paint should be avoided.

4.14 Natural Resources and Energy Supply

FAA Order 1050.1E states that a significant environmental impact to energy and natural resource consumption occurs when airport actions result in a demand that exceeds supply in relation to the use of energy by new stationary facilities and changes in ground vehicles and/or aircraft.

Under the No Action alternative, no effect to natural resources and energy supply would occur. The Proposed Action would occur on land that is currently and has been historically used for aviation and aviation-related purposes. The proposed ATCT site, the Airport, and the surrounding areas are not known to contain any significant mineral resources of value to the region or residents of the State. While excavation would occur for the purpose of installing piles to support the relocated ATCT, the excavation activities would be minor and no loss of any mineral resources would occur. Therefore, no impact to these resources resulting from the Proposed Action would be anticipated.

The Proposed Action would not affect energy or other natural resource consumption where demand exceeds the capacity of the supplier. While energy use would increase during construction, once the ATCT is operational, energy use would be similar to levels experienced at the Airport today.

4.15 Hazardous Materials, Pollution Prevention, and Solid Waste

4.15.1 Solid Waste

The California Integrated Waste Management Act (Assembly Bill (AB) 939) was enacted in 1989 to address what were perceived as urgent problems of "diminishing landfill space and potential adverse environmental impacts from landfilling." AB 939 diversion incentives stimulated investments in recovery technologies and the development of a new recycling and composting infrastructure throughout California. Statewide, recycling rates have increased from an estimated 10 percent in 1988 to 54 percent in 2008.[43]

The main facilities that generate solid waste at SFO include the passenger terminals, cargo facilities, and aircraft maintenance and service centers. The CCSF contracts with South San Francisco Scavenger Company to provide solid waste disposal services. Some Airport tenants have their own waste disposal contracts with South San Francisco Scavenger Company or other companies.[44] Construction activities also generate solid waste; construction-related solid waste impacts are discussed in Section 4.16.4.

Newspaper, glass, and aluminum recycling bins are located at restaurants, bars, and coffee stands and at other passenger and administrative areas in the terminal complex. South San Francisco Scavenger Company hauls the mixed waste and source-separated materials from SFO to the Blue Line Transfer Station, where the waste is sorted. The Blue Line Transfer Station is located at 180 Oyster Point Boulevard in South San Francisco. After processing at the Blue Line Transfer Station, the residual waste is transported to Ox Mountain Landfill near Half Moon Bay. Ox Mountain Landfill's capacity for accepting solid waste is estimated to be available through 2018.[45]

A Zero Waste Plan has been implemented at the Airport. In 2007, more than 55 percent of SFO's municipal waste was recycled.[46] In 2009, the recycling rate had increased to 70.5 percent. A summary of municipal solid waste generation and recycling quantities is presented in **Table IV-4**.

Solid waste generation would not be affected by the No Action alternative. The CCSF would continue its present practices, including implementation of its Zero Waste Plan.

The Proposed Action would result in an increase of 8,700 square feet of office space. This increase in office space is not expected to result in a significant increase in human activities and, therefore, a significant increase in the generation of trash and solid waste would not be expected. Thus, neither the No Action nor the Proposed Action would have a significant effect on solid waste generation rates at the Airport.

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[43] Dr. Kay Martin Commentary, Vice-President, Bio Energy Producers Association, January 14, 2009; http://www.bioenergyproducers.org/index.php/news/26-renewable-energy-and-waste-diversion (accessed January 13, 2011).

[44] U.S. Department of Transportation, Federal Aviation Administration, *Environmental Assessment, Volume 1 – Airport Master Plan Improvements, San Francisco International Airport,* October 1998.

[45] Cal Recycle, *Active Landfills Profile for Ox Mountain Sanitary Landfill*, 2000; http://www.calrecycle.ca.gov/Profiles/Facility/Landfill/LFProfile1.asp?COID=1&FACID=41-AA-0002 (accessed January 12, 2011).

[46] San Francisco International Airport, *2008 Environmental Sustainability Highlights*, 2009; http://www.flysfo.com/web/export/sites/default/download/about/reports/pdf/2008eshighlights.pdf (accessed January 13, 2011).

Table IV-4

Municipal Solid Waste Recycling and Landfill Disposal Tonnage at SFO

Activity Type	Municipal Solid Waste Generation (tons) 1990 1/	2007	2009
Total Municipal Solid Waste Generated	9,913	10,711	n.a.
Sent to Landfill	9,913	4,434	n.a.
Recycled	0	6,277	n.a.
Percent Recycled	0%	58.6%	70.5%

Notes:
n.a. = not available.
1/ Solid waste generation rates for 1990 were estimated on the basis of a 2007 generation rate of 0.87 pound of solid waste per passenger. It was also assumed that no solid waste recycling was conducted in 1990.

Source: San Francisco International Airport, *SFO Climate Action Plan*, revised February 2010; http://www.flysfo.com/web/page/about/green/index.html, see San Francisco International Airport SFO Climate Action Plan Revised February 2010 (accessed March 10, 2011).
Prepared by: AGS, Inc., January 2011.

4.15.2 Hazardous Materials and Pollution Prevention

4.15.2.1 Regulatory Setting

Several federal acts regulate the handling of hazardous wastes, substances, and materials. These include:

- The Resource Conservation and Recovery Act of 1976 (RCRA) is intended to provide "cradle to grave" management of hazardous and solid wastes, and regulation of underground storage tanks (USTs) containing chemical and petroleum products.
- The RCRA was amended by the Hazardous and Solid Waste Amendments of 1984, which addressed corrective actions and permitting of hazardous waste.
- The Toxic Substances Control Act of 1976 gives the U.S. EPA the ability to track the 75,000 industrial chemicals currently produced or imported into the United States.
- The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), referred to as "Superfund", created a public trust fund to assist with the cleanup of inactive and abandoned hazardous waste sites and accidentally spilled or illegally dumped hazardous materials. Only sites listed on the National Priorities List (NPL) are eligible for funding through CERCLA.
- The Oil Pollution Control Act provides regulations for the prevention of and response to oil spills.

The U.S. EPA has delegated much of its regulatory authority to individual states whenever adequate state regulatory programs exist. The Toxic Substance Control Division of the California Department of Health Services is the agency empowered to enforce federal hazardous materials and waste regulations in California. State hazardous materials and waste laws are contained in the California Code of Regulations, Title 26. The Department of Health Services acts as the lead State agency in some site investigations and remediation projects.

The APE is located within the jurisdiction of the San Francisco Bay RWQCB. The San Francisco Bay RWQCB is authorized by the State Water Resources Control Board to enforce the provisions of the Porter-Cologne Water Quality Control Act of 1969, which incorporates federal water protection laws. This Act gives the San Francisco Bay RWQCB authority to require groundwater investigations

when the quality of the waters of the State have been or could be threatened and to remediate the site if necessary (see Section 4.6.2).

The San Mateo County Department of Environmental Health (DEH) is directly involved in the management of hazardous materials and wastes at the Airport. The various airline facilities and generators of hazardous wastes at SFO are permitted and inspected yearly by San Mateo County DEH. The San Mateo County DEH also permits and inspects USTs at SFO. The local Fire Department, in coordination with the SFO Facilities, Operations, and Maintenance Division, regulates the use and storage of flammable liquids at the Airport. The Fire Department conducts regular inspections of above-ground storage tanks and facilities in which hazardous materials are used or stored, and reports of those inspections are kept on file. The Facilities, Operations, and Maintenance Division follows up on any suspected violations in hazardous materials handling.[47]

4.15.2.2 Hazardous Materials and Wastes at San Francisco International Airport

The largest quantity of hazardous materials used at the Airport consists of aviation fuel. The fuel is distributed throughout SFO via pipelines to fuel hydrants in the passenger terminal apron areas. Aviation fuel for aircraft operating on other parts of the airfield (such as general aviation and cargo aprons) is distributed by tanker trucks. Most aviation fuel is used during aircraft operations and, therefore, generates little hazardous waste. In addition to aviation fuels, smaller quantities of other hazardous materials are stored and used at the Airport for various purposes. The Airport, airlines, and rental car maintenance facilities, for example, have underground gasoline storage tanks and facilities for the storage of associated solvents, cleaners, and motor oil. Airline and other Airport tenants store and use various hazardous materials, such as solvents, degreasers, cleaners, deicers, paints, paint thinners, diesel fuel, welding gases, and pesticides in support of aircraft, ground vehicles, and buildings and ground maintenance and operations. A file review conducted in January 2011 at the San Mateo County DEH confirmed that various airlines and hazardous waste generators at SFO hold valid permits and filed hazardous materials business plans (HMBPs) with San Mateo County. Most of these facilities are permitted to each store less than 219 gallons or 1,999 pounds of hazardous materials.

Most of the wastes at the Airport facilities are recycled. These wastes include used oil, spent jet fuel, and waste absorbent. At the American Airlines facilities, for example, spent jet fuel is shipped to Chevron facilities, where it is blended to make off-specification fuel. The waste absorbent goes through a high temperature and pressure process to retain the petroleum hydrocarbons and recycle back the absorbent. Used oil is sent to various permitted facilities for recycling.

No hazardous materials or wastes are expected to be generated by the relocated ATCT facilities. However, in the event of a power failure at the Airport, a backup generator required to provide power to the ATCT would use a small above ground diesel fuel tank. This tank would be double contained and managed in compliance with the local Fire Department health and safety procedures, as is the tank for the existing backup generator. Other minor quantities of cleaning and janitorial materials would also be used at the new facilities, similar to what is currently used in the existing ATCT.

4.15.2.3 Environmental Contamination and Remediation

Several hazardous material releases have occurred at the Airport, which have resulted in localized contamination. All of these releases involved fuel spills or leaks. All have either been cleaned up,

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[47] City and County of San Francisco, Planning Department, *San Francisco International Airport Master Plan, Final Environmental Impact Report*, May 28,1992.

are under remediation, or are being monitored. Site investigations and remediation activities are under the jurisdiction of the San Francisco Bay RWQCB (see Section 4.6.2).

Contaminant plumes identified in the site vicinity appear to occur in close proximity to the underground fuel pipelines. Because contaminants appear concentrated in areas associated with the pipelines (see Exhibits IV-4, IV-5, and IV-6), lower concentrations of hydrocarbons in soil and groundwater would be expected at the proposed ATCT location than reported during investigations of hydrocarbon releases from pipelines in the nearby vicinity.[48] The proposed site for the ATCT relocation at Courtyard 2 is not listed on any of the environmental databases searched. There are no NPL or candidate NPL sites or other active CERCLA sites at or adjacent to the proposed ATCT site.[49]

4.15.2.4 Asbestos, Lead, and Polychlorinated Biphenyls

Asbestos surveys conducted by the CCSF have indicated the presence of asbestos-containing material (ACM) in the terminal buildings in the following types of building materials: floor tile and mastic, roofing, drywall and joint tape, duct wrap, thermal system insulation, fireproofing, and pipe lagging. In accordance with State and federal regulations, asbestos abatement would be required prior to any demolition, as discussed in Section 4.16.4.[50]

SCA Environmental, Inc., conducted limited bulk asbestos and lead-based paint surveys in 1995 at the SFO garage, Boarding Areas B and D, and walkways E and F.[51] Lead-based paint was identified as yellow safety paint in the short term parking garage, orange paint in Boarding Area D, and yellow safety paint in walkways E and F. The presence of lead-based paint at these identified locations at SFO may indicate the existence of lead-based paint at areas to be demolished at Terminal 2, as discussed further in Section 4.16.4. The SCA Environmental, Inc. report also stated that lighting ballasts with PCBs and mercury-containing fluorescent lighting were noted in the short term parking garage and Boarding Area D. If such ballasts and fluorescent lighting are encountered at the areas to be demolished at Terminal 2, they should be removed and sent out to a permitted facility for disposal or recycling, as discussed in Section 4.16.4.

4.15.2.5 Health and Safety Programs and Regulatory Compliance

Effective health and safety programs are the principal means of ensuring the health and safety of Airport employees, construction workers, the public, and the environment. The primary health and safety plans and policies in place at the Airport include an Injury and Illness Prevention Plan, a Hazard Communication Plan, HMBPs, an SWPPP, and an Emergency Response Plan. These plans are on file at the Airport, San Mateo County DEH, and the City Office of Emergency Services. Active regulatory oversight is an important mechanism for maintaining a healthy and safe environment and inspections are regularly conducted by the San Mateo County DEH. Individual airlines also have health and safety guidelines that cover the handling of hazardous materials, employee health and safety, and specific in-flight storage for each make and model of aircraft.

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48 Environmental Science Associates, *Revised Phase I Environmental Site Assessment, San Francisco International Airport, Airport Traffic Control Tower Relocation Project*, March 2009.

49 Environmental Data Resources, Radius Map with Geocheck, December 14, 2010.

50 Environmental Science Associates, *Revised Phase I Environmental Site Assessment, San Francisco International Airport, Airport Traffic Control Tower Relocation Project*, March 2009.

51 SCA Environmental, Inc., *Summary Report: Limited Bulk Asbestos and Lead-Based Paint Survey and Associated Environmental Hazards, SFO Garage, Domestic Terminals B, D, and Walkways E & F, San Francisco, California*, December 1995.

4.15.2.6 Analysis of Potential Effects

There would be no effects under the No Action alternative from hazardous wastes and materials other than those that already occur from operation of the Airport. The airlines and some other tenants at the Airport are permitted hazardous waste handling facilities. Hazardous wastes and materials at these facilities are handled according to individually prepared HMBPs and are inspected by the San Mateo County DEH for compliance.

The relocated ATCT site is not listed on any of the federal, State, or local databases searched as part of the Phase I ESA. There are no NPL or candidate NPL sites or other active CERCLA sites at or adjacent to the APE. The operation of the relocated ATCT and associated facilities are not expected to generate any significant hazardous wastes or require the handling of hazardous materials with the exception of a small diesel tank and/or an above ground diesel tank for the required backup emergency generator. Such a tank would be double contained, operated under a permit from the Fire Department, and managed under a Spill Prevention, Control, and Countermeasure Plan. No other storage or use of hazardous substances or petroleum products, other than small amounts of materials used for routine building and equipment maintenance (such as cleaning and janitorial materials), is expected as a result of the Proposed Action. Hazardous materials associated with construction activities are discussed in Section 4.16.4.

4.16 Construction Impacts

Construction impacts result directly and solely from construction activities and are, therefore, limited to the construction period. Additionally, the construction period is of relatively short duration in comparison to the design life of a facility, and the impacts from such operations can be mitigated using appropriately designed and phased construction techniques. Specific effects of construction activities have the potential to cause air and noise impacts, as well as soil and water quality impacts, resulting from onsite construction equipment operations and material deliveries.

In accordance with FAA Order 1050.1E, the sponsor must follow local, state, tribal, or federal ordinances and regulations to address the impacts of construction activities, including construction noise, dust and noise from heavy equipment traffic, disposal of construction debris, and air and water pollution. Although construction activities have the potential to create impacts that are temporary in nature, the severity of potential impacts diminish as work progresses and generally disappear after the construction phase. Also, construction impacts alone are rarely significant pursuant to NEPA. Under the No Action alternative, no construction activities would occur, and there would be no construction-related impacts.

4.16.1 Construction Noise

Construction of the relocated ATCT may result in the temporary exposure of Airport employees and patrons to the generation of excessive groundborne vibration and noise levels. Construction of the ATCT would require some minor excavation and potentially the use of pile driving equipment to set the foundations for the Tower. In addition, because of the location of the relocated ATCT relative to the airfield and local roadways, and the ongoing renovations to Terminal 2 and subsequent renovations to Terminal 1, the noise generated by construction activity would not be significantly greater than the noise levels generally experienced in the surrounding areas. As the land uses surrounding the APE are generally industrial and commercial in nature, there are no noise sensitive land uses in the areas adjacent to the relocated ATCT site. Therefore, any groundborne vibration or noise impacts resulting from construction activities would be temporary and have no significant effect.

4.16.2 Air Quality

Construction-related air pollutant emissions are discussed in Section 4.5. The CCSF shall implement the Bay Area Air Quality Management District's (BAAQMD) Basic Construction Mitigation Measures (that are recommended for all projects whether or not construction-related emissions exceed applicable thresholds of significance) to reduce pollutant emissions during construction activities:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by certified mechanics and determined to be running in proper condition prior to operation.
- Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

4.16.3 Water Quality

The water quality effects caused by the Proposed Action, including the impact of construction and demolition activities, were discussed in Section 4.6. The construction and demolition activities associated with the Proposed Action could temporarily expose soil surfaces and/or stockpiled soil to wind and water erosion, causing sedimentation that would adversely affect water quality.

Pollutants with the greatest potential to be present in storm water runoff and groundwater as a result of the Proposed Action are oil and grease, as well as petroleum hydrocarbons. The most likely transport mechanisms for these substances into storm water or groundwater systems is through spills or leaks, flow of rainwater, and outdoor area washdowns.

With implementation of SWPPP BMPs, and adherence to the NPDES permit requirements, projected increases in storm water runoff, transportation, and construction activities under the Proposed Action would not significantly affect surface water or groundwater quality or discharge at SFO. The Proposed Action is not expected to significantly increase the quantity or quality of surface water runoff and would not require modifications to existing BMPs or water management programs.

The potential for water quality impacts in the deeper aquifer (the "A" zone) resulting from pile driving and other construction activities is considered low based on soil and groundwater conditions at SFO and the scope of the proposed work.[52]

Dewatering of contaminated groundwater, if encountered during excavation, would be performed prior to project construction. Confirmation sampling and groundwater monitoring would be conducted and a work plan prepared in accordance with San Francisco Bay RWQCB Order No. 99-045 to verify that remediation actions were successful. Measures would be in place for handling contaminated soil and groundwater and for the protection of workers, the public, and the environment, including:

- Sampling and analysis of the excavated soil and encountered groundwater;
- Complying with San Francisco Bay RWQCB Final Order 99-045, which specifies measures to protect workers and the public from exposure to hazards, and provides for site cleanup in accordance with appropriate regulatory guidance;
- Preparing a Health and Safety Plan and following OSHA safety measures;
- Complying with the SWPPP; and
- Use of BMPs, such as covering soil during rainy days and avoiding concrete wash release into storm drains.

With implementation of the SWPPP BMPs and proper health and safety measures mentioned above, the effect of construction on surface and groundwater quality would be less than significant.

There would be no impacts to water quality under the No Action alternative other than those already posed by the existing Airport. Airport management would continue to implement the SWPPP and comply with San Francisco Bay RWQCB Order 99-045 for the subsurface soil and groundwater investigation, cleanup, and monitoring.

4.16.4 Solid and Hazardous Waste

The effects of the Proposed Action, including the effects of construction and demolition activities, were discussed in Section 4.15.

4.16.4.1 Excavation

Construction of the proposed relocated ATCT would involve the excavation of soil for the foundation. Soil and groundwater contamination, mainly caused by leaks of jet fuel, in the vicinity of the APE, at Boarding Areas B and C, was reported in the Phase I ESA.[53] Therefore, soil affected by jet fuel or other contaminants may be encountered during soil excavation at the Proposed Action site. Because of the close proximity of the APE to known subsurface soil and groundwater contamination (see Exhibits IV-5 and IV-6), such contamination may be encountered during the excavation and erection of the new foundations for the new ATCT. The known contaminants in soil and groundwater in the vicinity of the Proposed Action are mainly petroleum hydrocarbons and

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[52] U.S. Department of Transportation, Federal Aviation Administration, *Environmental Assessment, Volume 1 – Documentation, Airport Master Plan Improvements, San Francisco International Airport, San Francisco, California*, October 1998.

[53] Environmental Science Associates, *Revised Phase I Environmental Site Assessment, San Francisco International Airport, Airport Traffic Control Tower Relocation Project*, March 2009.

constituents of jet fuel. However, all known sources of contamination at Boarding Areas B and C, in the vicinity of Courtyard 2, have been remediated.[54]

If contaminated soils or groundwater are identified through physical testing, the CCSF would prepare a site remediation plan, prior to excavation or grading. Such a plan would be in compliance with San Francisco Bay RWQCB Order No. 99-045, which specifies measures to protect workers and the public from exposure to hazards, and provides for site cleanup in accordance with appropriate regulatory guidance. In accordance with OSHA requirements, the CCSF would prepare a Site Health and Safety Plan prior to commencing work on a contaminated site. The safety regulations in the OSHA requirements and applied onsite, through execution of the Health and Safety Plan, would protect construction workers and others from exposure to soil and groundwater contaminants.

4.16.4.2 Building Demolition

In addition to excavated soil, demolition of the existing ATCT and the upper levels of Terminal 2 would generate concrete, asphalt, and various metal and nonmetal debris. In conformance with the SFO Zero Waste Plan, more than 90 percent of the construction waste generated by the Proposed Action would be recycled. The remaining waste would be disposed of at the Ox Mountain Landfill, which handles construction, demolition, and mixed municipal waste. The landfill has a permitted throughput of 3,598 tons per day and is anticipated to have sufficient capacity through 2018.[55]

Asbestos could be encountered during demolition of the existing ATCT and upper levels of Terminal 2. The area to be demolished would be surveyed for ACMs and appropriate abatement of identified asbestos would be conducted prior to demolition. ACM is regulated both as a hazardous air pollutant under the Clean Air Act and as a potential worker safety hazard under the authority of the California Division of Occupational Safety and Health (also referred to as Cal/OSHA). Airport management would retain contractors licensed to conduct asbestos abatement work and notify the Bay Area Air Quality Management District 10 days prior to initiating construction and demolition activities.

Other hazardous materials that may be encountered in the areas to be demolished would include lead-based paint, lighting ballasts with poly-chlorinated biphenyls (PCBs), and mercury-containing fluorescent lighting. All lead-based paints would either be removed or stabilized prior to demolition by a licensed and specialized lead remediation contractor under the supervision of a California Department of Health Services Certified Lead Consultant. Lead-based paint debris would be handled, profiled, and disposed of according to the requirements of the regulated disposal facility, in compliance with all federal, State, and local regulations. When ballasts and fluorescent lighting are encountered in the areas to be demolished, they would be removed and sent to a permitted facility for disposal or recycling.

4.16.4.3 Analysis of Potential Effects

As a result of the aggressive recycling history at SFO, it is estimated that more than 90 percent of the construction waste resulting from the Proposed Action would be recycled. The remaining 10 percent of construction waste would most likely be accommodated at Ox Mountain Landfill, which has the

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[54] Environmental Cost Management Inc., *2009 Second Semi-Annual Groundwater Monitoring, System Operations, and Soil Vapor Monitoring Report, Delta Airlines, Inc. Boarding Areas B and C, San Francisco International Airport*, June 10, 2010.

[55] Cal Recycle, *Active Landfills Profile for Ox Mountain Sanitary Landfill*, 2000, http://www.calrecycle.ca.gov/Profiles/Facility/Landfill/LFProfile1.asp?COID=1&FACID=41-AA-0002 (accessed January 12, 2011).

capacity to receive waste until 2018. Therefore, solid waste impacts of the Proposed Action, as they relate to increases in construction and demolition wastes, would not be significant.

As mentioned above, with the proper profiling and disposal of any contaminated soil encountered during construction of the Proposed Action, and the proper handling of materials containing, asbestos, lead, mercury, or PCBs, the effects from hazardous wastes encountered during construction activities would be less than significant.

4.16.5 Construction Traffic

The majority of construction staging and automobile parking related to the Proposed Action would occur at Gate C-41 (see Exhibit III-1). As the result of ongoing renovations at Terminal 2 and subsequent renovations that will begin at Terminal 1, construction traffic is accommodated at the Airport on a daily basis. Construction of the ATCT would nominally increase the amount of construction traffic and is not expected to significantly affect existing or future traffic levels at the Airport.

4.17 Cumulative Impacts

Cumulative impacts to environmental resources result from incremental effects of proposed actions when combined with other past, present, and reasonably foreseeable future projects in the area. Cumulative impacts can result from individually minor, but collectively substantial, actions undertaken over a period of time by various agencies (federal, state, and local) or individuals. In accordance with NEPA, a discussion of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or planned for implementation in the near future is required.

For purposes of this analysis, projects implemented within the last 5 years or proposed to be implemented within the next 5 years, and located within 1-mile of the project site were identified (see Table III-6 in Chapter III). The proposed ATCT site has been previously developed and used for Airport purposes; it currently contains parking spaces for FAA staff and Airport police. Surrounding areas have also been developed for a variety of Airport uses.

Seven known projects that are not part of the planned development assessed in this EA, but are within the general vicinity of the APE, would be constructed at the Airport within the same timeframe as the Proposed Action. They are:

- Improvements to the runway safety areas (RSAs)
- Construction of a hydrogen/hythane fueling station
- Boarding Area E renovation
- Reconstruction of aircraft aprons at Boarding Areas C, E, F, and G and Plot 40
- Terminal 1 renovation and Boarding Area B
- South McDonnell Road realignment
- Reclaimed water system project

In addition, several other projects in areas surrounding the Airport are ongoing or are scheduled to be initiated within the same timeframe as the Proposed Action. These include:

- Millbrae Wastewater Pollution Control Plan Flow Equalization Project
- Terrabay Phases II/III
- San Bruno CalTrain station relocation
- Downtown Mixed-Use Project (San Bruno)

Anticipated impacts from the construction of these projects include:

- Temporary increases in emissions;

- Temporary increases in noise from construction equipment activity;
- Temporary increases in construction and demolition debris; and
- Potential impacts to local surface transportation patterns resulting from an increase in traffic on local roadways during construction and operation of the projects listed above.

Temporary increases in emissions at the Airport would be controlled through implementation of emission control measures, including watering of disturbed areas, covering soil and sand stockpiles, covering trucks hauling soil and sand, and implementing maintenance programs for construction vehicles aimed at minimizing emissions (see Section 4.16.2).

The majority of construction activity associated with these projects would occur during normal business hours, when noise from these activities would be less noticeable because of other noise sources in the area. Because most of the activity would occur on the Airport and away from sensitive noise receptors, construction noise impacts are not anticipated to be significant.

Neither the Proposed Action nor any of the other planned activities at SFO are expected to cause any significant increase in the numbers of passengers, flights, or services. Therefore, solid waste impacts, as they relate to increases in waste generation by human activities, would be less than significant. Although the Proposed Action and other planned construction at SFO would increase the generation of construction waste and debris, such an increase is already mitigated by the following:

- SFO's 90 percent construction waste recycling rate;
- The temporary generation of waste during construction; and
- The adequate capacity of the Ox Mountain Landfill to receive anticipated quantities of solid waste generated by construction.

Therefore, cumulative solid waste impacts, as they relate to increases in solid waste, would be less than significant.

Construction activities at the Airport, in addition to the Proposed Action, will likely result in more petroleum products and hazardous materials handled and more potential for releases of these materials. The planned activities at SFO could also potentially affect water quality in the area as a result of erosion or contaminant exposure from construction areas. However, adherence to federal and State waste regulations and storm water pollution prevention practices, coupled with best management practices, would be in place to prevent any significant impacts from these projects. Therefore, no significant cumulative impacts to water quality are expected.

Impacts associated with the Proposed Action would be related to construction activities and minor changes to surface traffic patterns compared to the No Action alternative. The Proposed Action is not anticipated to increase the type or amount of activity at the Airport, except for temporary increases in construction traffic and possible minor changes in surface transportation patterns. Thus, the Proposed Action, when considered with the projects identified above as being within the general vicinity of the Study Area, would not create significant cumulative impacts with respect to air quality, noise, or surface traffic patterns.

4.18 Other Considerations

The Proposed Action is not likely to be environmentally controversial and no known organized opposition to the Proposed Action exists. The Proposed Action is consistent with the plans, goals, and policies of San Mateo County. In addition, the Proposed Action is not likely to directly, indirectly, or cumulatively create a significant impact on the human environment.

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V. List of Preparers, List of Parties Notified

This section identifies the principal preparers of this Draft EA, and identifies who was sent a copy of the Draft EA for review and comment.

5.1 List of Preparers

The following individuals prepared the Draft EA. Information provided includes the organizations for which each individual works, a brief synopsis of their relative experience and qualifications, and their responsibilities in the preparation of this Draft EA document.

5.1.1 Principal Federal Aviation Administration Reviewers

John Louie, NEPA Specialist, ATO Western Service Area

FAA project manager and main ATO contact.

Lorraine Herson-Jones, FAA Counsel, Office of the Regional Counsel

David P. Kessler, AICP, Regional Environmental Protection Specialist, Airports Division, Western-Pacific Region

5.1.2 San Francisco International Airport

Audrey Park, Environmental Planner

Sponsor's contracting project manager. Overall review and coordination with FAA Air Traffic Organization, Western Service Area; SFO divisions; consultant team; and stakeholders.

Avant Ramsey, Airport Planner

Responsible for data collection, document review, and coordination support for the project team.

5.1.3 Ricondo & Associates, Inc.

John C. Williams, Senior Vice President

Qualifications – Over 29 years of experience in airport environmental and physical planning, with significant experience in preparing and managing environmental assessments and environmental impact statements, airport noise compatibility planning projects, airport master planning projects, and airfield and airspace analyses.

Responsibilities – Overall quality control and NEPA guidance.

Stephen D. Culberson, Director

Qualifications – Over 20 years of experience in airport environmental and planning studies, with significant experience in preparing and managing environmental assessments and environmental impact statements, airport master planning projects, and activity forecasts.

Responsibilities – Project management, NEPA documentation, purpose and need, alternatives, affected environment, and environmental consequences.

Jason M. Apt, Senior Consultant

Qualifications – Over 8 years of airport and environmental planning experience, primarily in conducting air quality and land use compatibility analyses.

Responsibilities – Air quality assessment and analyses.

Lisa M. Reznar, Director

Qualifications – Over 12 years of airport environmental and planning experience. .

Responsibilities – Lead author for Purpose and Need and Alternatives sections.

Stephen C. Smith, Director

Qualifications – Over 12 years of environmental airport and air traffic experience, with particular expertise in aircraft noise analyses.

Responsibilities – Responsible for directing and reviewing the noise analysis.

Casey L. Venzon, Consultant

Qualifications – Over 3 years of airport environmental experience, with particular expertise in sustainability.

Responsibilities – Responsible for managing documentation and project records.

5.1.4 AGS, Inc.

Bahram Khamenehpour, PhD, SE, Senior Vice President/Senior Principal Geotechnical Engineer

Qualifications – Over 28 years of experience, specializing in management of multi-disciplinary projects, geotechnical and environmental engineering, hazardous waste management, and earthquake engineering.

Responsibilities – Responsible for review and management of sections prepared by AGS, Inc.

Sami Malaeb, PE, REA, Senior Environmental Engineer

Qualifications – Over 20 years of experience in soil and groundwater investigations and remediation, with particular expertise in water quality and hazardous waste management.

Responsibilities – Responsible for the water quality and solid and hazardous waste management sections.

5.1.5 BridgeNet International

Paul Dunholter, President and Managing Director

Qualifications – Over 25 years conducting airport noise assessments, noise abatement programs, and development of airport noise system monitoring software.

Responsibilities – Noise

5.1.6 CIRCA: Historic Property Development

Sheila McElroy, Principal, Historic Preservation Specialist

Qualifications – Almost 20 years of historic preservation and architectural research, management and design-related experience with profit and non-profit corporations, including eight years of experience as executive director for Main Street towns.

Responsibilities – Historic, archaeological, architectural, and cultural resources.

Sarah Hahn, Architectural Historian

Qualifications – Architectural historian with a range of experience in the field including hands-on conservation both in the U.S. and abroad, preservation planning, interpretation and education, and extensive cultural resource documentation and evaluation.

Responsibilities – Historic, archaeological, architectural, and cultural resources.

5.1.7 ICF International

Jennifer Stock, Landscape Architect

Qualifications – Over 11 years of experience in preparing visual analyses for NEPA and CEQA environmental documentation for a variety of project types.

Responsibilities – Visual impact assessment and analysis.

Timothy Messick, Senior Graphic Artist

Qualifications – Over 13 years of experience preparing maps and information graphics for environmental documents, with particular expertise in visual simulations for visual impact assessments.

Responsibilities – Prepared the visual simulations of the proposed ATCT.

5.2 List of Parties Notified

A Notice of Availability for the Draft Environmental Assessment is being published on Wednesday, April 13 in the *San Francisco Chronicle, San Jose Mercury News,* and the *San Mateo County Times.* A copy of the notification is also being mailed to the agencies and organizations listed below. A copy of the Draft Environmental Assessment in Adobe Acrobat format is also being posted on the project website at, www.ricondoprojects.com/SFO/.

5.2.1 Federal Agencies

- Nova Blazej, Manager, Environmental Review Office, US Environmental Protection Agency, Region 9
- Sean Cullinane, FAA Airport Traffic Control Tower
- Steve Edmondson, Area Office Supervisor – Habitat Conservation Division, NOAA National Marine Fisheries Service (Southwest Regional Office)
- Robert Hargrove, Director of NEPA Compliance Division, US Environmental Protection Agency, Office of Federal Activities (within Office of External Affairs)
- Executive Officer, United States Coast Guard
- Cameron Johnson, South Branch Chief – Regulatory Division, US Army Corps of Engineers (San Francisco District)
- Ryan Olah, Chief - Coastal Branch, US Fish and Wildlife Service (California and Nevada Region 8-Ecological Services)
- Andrew Raabe, US Fish and Wildlife Service (California and Nevada Region 8-Ecological Services)
- Melissa Scianni, Life Scientist - Water Division, US Environmental Protection Agency, Region 9
- Bob Smith, US Army Corps of Engineers (San Francisco District)

5.2.2 State Agencies

- Charles Armor, Regional Manager, California Department of Fish and Game (Region 3, Bay Delta Region)
- Terry Barrie, Office of Aviation Planning, California Department of Transportation – Division of Aeronuatics, MS 40
- Milford Wayne Donaldson, State Historic Preservation Officer
- Marla Lafer, WRCE, California Regional Water Quality Control Board (San Francisco Bay Region 2)
- Shin-Roei Lee, Chief - Watershed Management Division, California Regional Water Quality Control Board (San Francisco Bay Region 2)
- Cy Oggins, Chief, Division of Environmental Planning and Management, California State Lands Commission
- James B. Richards, Deputy District Director – Environmental Planning and Engineering, California Department of Transportation, District 4

5.2.3 Local Agencies

- Aaron J. Aknin, AICP, Community Development Director, City of San Bruno

- Robert Batha, Chief of Permits, San Francisco Bay Conservation and Development Commission
- Richard Berger, Manager of Economic and Community Development, City of Daly City
- Maureen Brooks, Planning Manager, City of Burlingame
- Dave Carbone, Transportation Systems Coordinator, City/County Association of Governments of San Mateo County
- Stacy Cocke, Senior Planner, Capital Project & Environmental Planning, San Mateo County Transit District
- Jim Eggemeyer, Director, San Mateo County, Department of Planning and Building
- Ann Flemer, Deputy Executive Director, Policy, Metropolitan Transportation Commission
- Lisa Grote, Director of Community Development, City of San Mateo
- Susy Kaulkin, Chief Planner, City of South San Francisco
- Doug Kimsey, Planning Manager, Metropolitan Transportation Commission
- Kenneth Kirkey, Planning Director, Association of Bay Area Governments
- Joe LaClair, Chief of Planning, San Francisco Bay Conservation and Development Commission
- Lindy Lowe, Senior Planner, San Francisco Bay Conservation and Development Commission
- Richard Marks, Community Development Department Director, City of Foster City
- William Meeker, Community Development Director, City of Burlingame
- Jaime Michaels, Principal Permit Analyst, San Francisco Bay Conservation and Development Commission
- Farhad Mortazavi, Community Development Director, City of Millbrae
- Richard Napier, Executive Director, City/County Association of Governments of San Mateo County
- David Petrovich, AICP, City Planner, City of Millbrae
- Jean Roggenkamp, Deputy Air Pollution Control Officer, Bay Area Air Quality Management District
- Lisa Costa Sanders, Acting Planning Manager, City of San Bruno
- Will Travis, Executive Director, San Francisco Bay Conservation and Development Commission
- Marty Van Duyn, Dir. Of Economic and Community Development, City of South San Francisco

5.2.4 Other

- John Avalos, Supervisor, District 11, City and County of San Francisco - Board of Supervisors
- David Campos, Supervisor, District 9, City and County of San Francisco - Board of Supervisors
- David F. Carbone, Roundtable Program Manager, SFO/Community Roundtable
- David Chiu, Supervisor, District 3, City and County of San Francisco - Board of Supervisors
- Carmen Chu, Supervisor, District 4, City and County of San Francisco - Board of Supervisors
- Malia Cohen, Supervisor, District 10, City and County of San Francisco - Board of Supervisors
- Sean Elsbernd, Supervisor, District 7, City and County of San Francisco - Board of Supervisors

- Mark Farrell, Supervisor, District 2, City and County of San Francisco - Board of Supervisors
- Bert Ganoung, Manager, SFO Noise Abatement Office, SFO/Community Roundtable
- Jackie Jacobberger, President, League of Women Voters of North and Central San Mateo County
- Ellen Johnck, Executive Director, Bay Planning Coalition
- Jane Kim, Supervisor, District 6, City and County of San Francisco - Board of Supervisors
- David Lewis, Executive Director, Save the Bay
- Jeremy Madsen, Executive Director, Greenbelt Alliance
- Eric Mar, Supervisor, District 1, City and County of San Francisco - Board of Supervisors
- Mike McCarron, Director, SFO Bureau of Community Affairs, SFO/Community Roundtable
- Sonny Mencher, President, Sequoia Audubon Society
- Ross Mirkarimi, Supervisor, District 5, City and County of San Francisco - Board of Supervisors
- Natural Resources Defense Council
- Elisha Novak, Airport Planner, FAA Airports District Office, Burlingame, SFO/Community Roundtable
- Larry Reed, Chapter Director, Sierra Club, Loma Prieta Chapter
- Scott Wiener, Supervisor, District 8, City and County of San Francisco - Board of Supervisors
- Jim Wunderman, President and CEO, Bay Area Council

5.2.5 Public Review

Copies of the Draft Environmental Assessment are also being made available at the following locations for public review during normal business hours.

- Bureau of Planning and Environmental Affairs, San Francisco International Airport, 710 N. McDonnell Road, 3rd Floor, San Francisco, California 94128
- Burlingame Public Library, 480 Primrose Road, Burlingame, California 94010
- Foster City Library, 1000 East Hillsdale Boulevard, Foster City, California 94404
- Millbrae Library, 1 Library Avenue, Millbrae, California 94030
- San Bruno Library, 701 Angus Avenue West, San Bruno, California 94066
- San Francisco Main Library, 100 Larkin Street, San Francisco, California 94102
- San Mateo Main Library, 55 West 3rd Avenue, San Mateo, California 94402
- Serramonte Main Library, 40 Wembley Drive, Daly City, California 94015
- South San Francisco Main Library, 840 West Orange Avenue, South San Francisco, California 94080

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VII. List of Abbreviations and Acronyms

A

AB – Assembly Bill

ACM – Asbestos-Containing Material

ALP – Airport Layout Plan

ALS – Approach Light System

ALUCP – Airport Land Use Compatibility Plan

APE – Area of Potential Effect

ASTM – American Society for Testing and Materials

ATCT – Airport Traffic Control Tower

B

BAAQMD – Bay Area Air Quality Management District

BART – Bay Area Rapid Transit

BCDC – San Francisco Bay Conservation and Development Commission

BMP – Best Management Practices

C

CAAA – Clean Air Act Amendments

CARB – California Air Resources Board

C/CAG – City/County Association of Governments of San Mateo

CCSF – City and County of San Francisco

CEQ – Council on Environmental Quality

CEQA – California Environmental Quality Act

CERCLA – Comprehensive Environmental Response, Compensation and Liability Act

CFR – Code of Federal Regulations

CLUP – Comprehensive Airport Land Use Plan

CNAHC – California Native American Heritage Commission

CNEL – Community Noise Equivalent Level

CNS – Communications, Navigation, and Surveillance

CO – Carbon Monoxide

D

dB – decibel

DEH – Department of Environmental Health

DNL – Day-Night Average Sound Level

DOT – U.S. Department of Transportation

DPS – Distinct Population Segment

E

EA – Environmental Assessment

EDMS – Emissions and Dispersion Modeling System

EIR – Environmental Impact Report

EIS - Environmental Impact Statement

EPA – U.S. Environmental Protection Agency

ESA – Environmental Site Assessment

ESU – Evolutionarily Significant Unit

F

FAA – Federal Aviation Administration

FE – Federally Endangered

FEMA – Federal Emergency Management Agency

FIRM – Flood Insurance Rate Map

FONSI – Finding of No Significant Impact

FR – Federal Register

FT – Federally Threatened

FWS – Fish & Wildlife Service

G

GA – General Aviation

GSE – Ground Support Equipment

H

HMBP – Hazardous Materials Business Plan

HVAC – Heating, Ventilating, and Air Conditioning

I

IATA – International Air Transport Association

IFR – Instrument Flight Rules

ILS – Instrument Landing System

INM – Integrated Noise Model

K

L

M

MLTP – Mel Leong Treatment Plant

N

n.a. – not available

NAAQS – National Ambient Air Quality Standards

NEPA – National Environmental Policy Act

NHPA – National Historic Preservation Act

NO_2 - Nitrogen Dioxide

NO_X - Oxides of Nitrogen

NOI - Notice of Intent

NPDES – National Pollutant Discharge Elimination System

NPIAS – National Plan of Integrated Airport Systems

NPL – National Priorities List

NPS – National Park Service

NRHP – National Register of Historic Places

NRIS – National Register Information System

O

O_3 – Ozone

OSHA – Occupational Safety and Health Administration

P

Pb – Lead

PBB – Passenger Boarding Bridge

PCBs – Polychlorinated Biphenyls

PL – Public Law

PM_{10} – Particulate Matter

$PM_{2.5}$ – Fine Particulate Matter

Q

R

RCRA – Resource Conservation and Recovery Act

ROD – Record of Decision

RSA – Runway Safety Area

RWQCB – San Francisco Bay Regional Water Quality Control Board

S

SE – State Endangered

SFO – San Francisco International Airport

SIP – State Implementation Plan

SO_2 – Sulfur Dioxide

SO_X - Sulfur Oxides

SWPPP – Storm Water Pollution Prevention Plan

T

TERPS – U.S. Standard for Terminal Instrument Procedures

TRACON – Terminal Radar Approach Control

TSCA – Toxic Substances Control Act

U

UAL – United Airlines

URBEMIS2007 – Urban Emissions 2007 Model

U.S.C. – United States Code

UST – Underground Storage Tank

V

VFR – Visual Flight Rules

VOCs – Volatile Organic Compounds

W

WPCP – Wastewater Pollution Control Plant

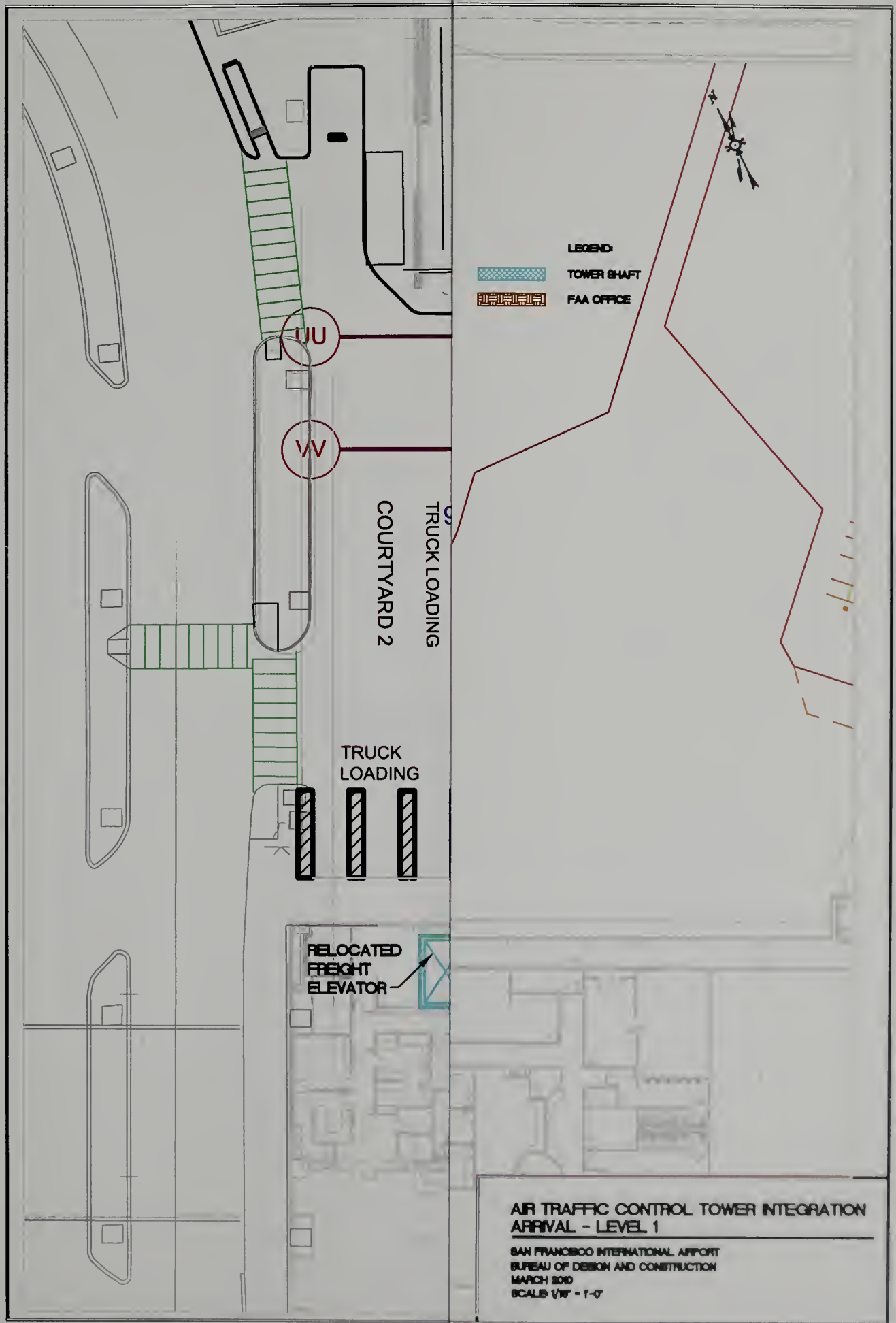
X

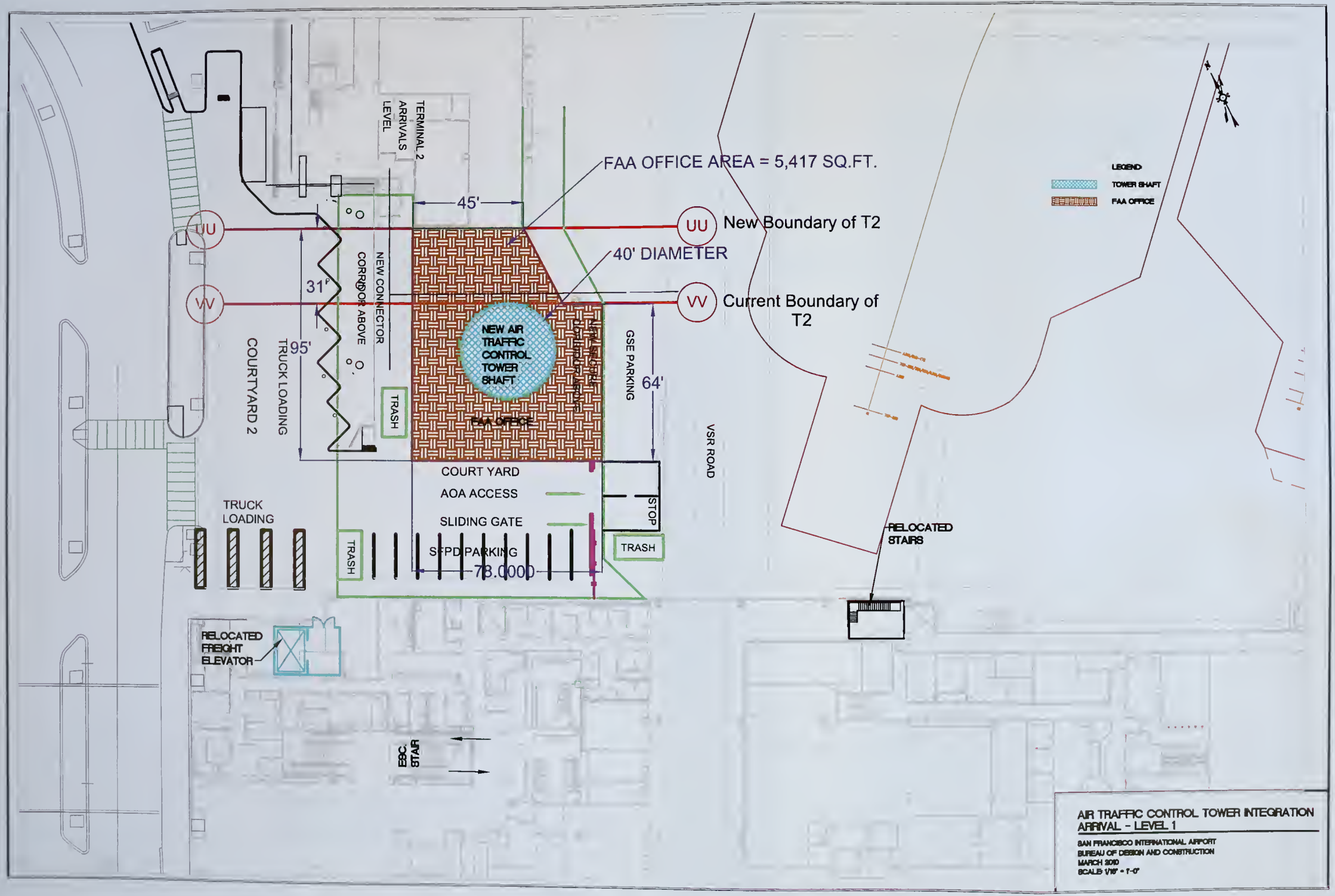
Y

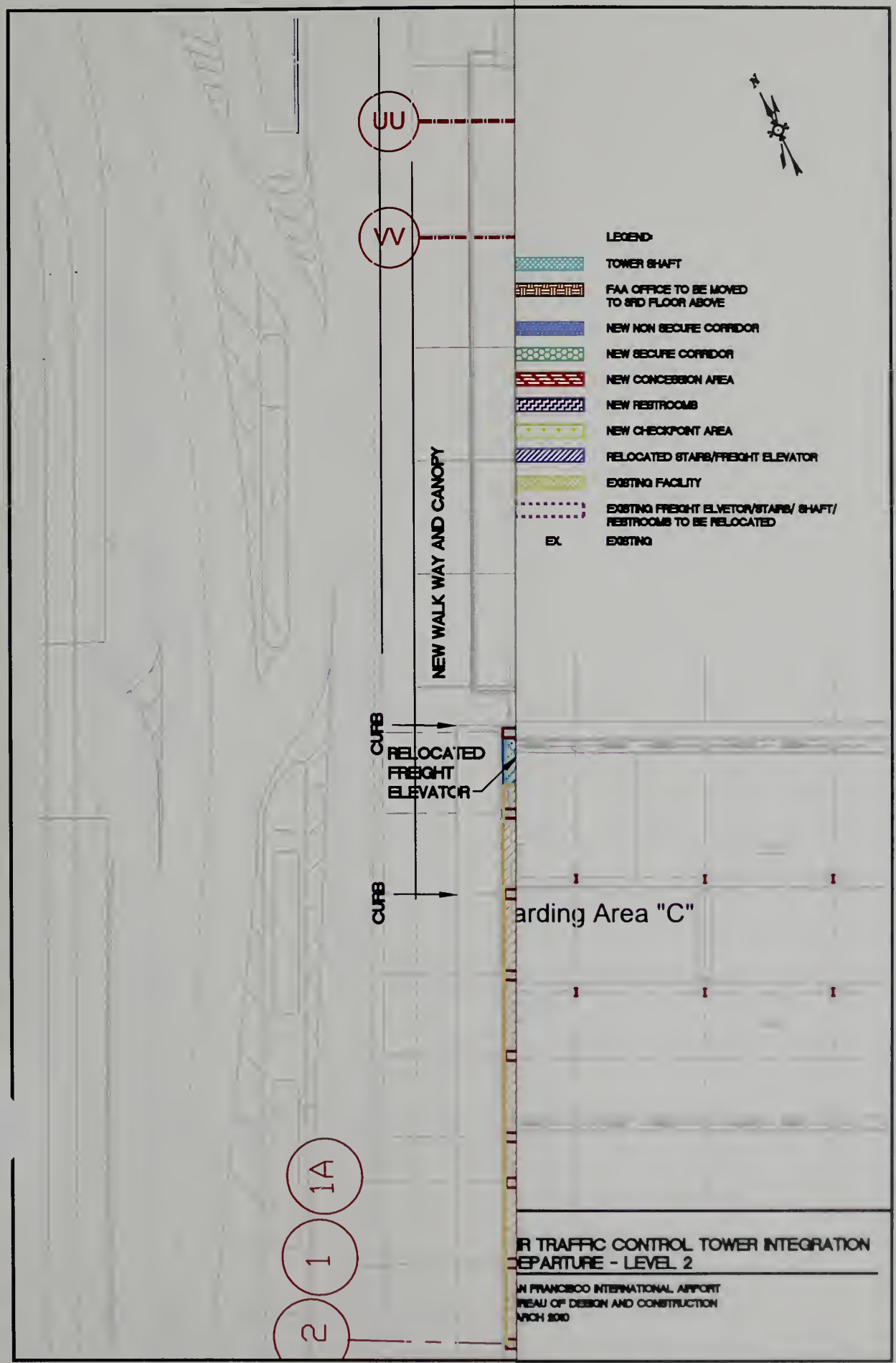
Z

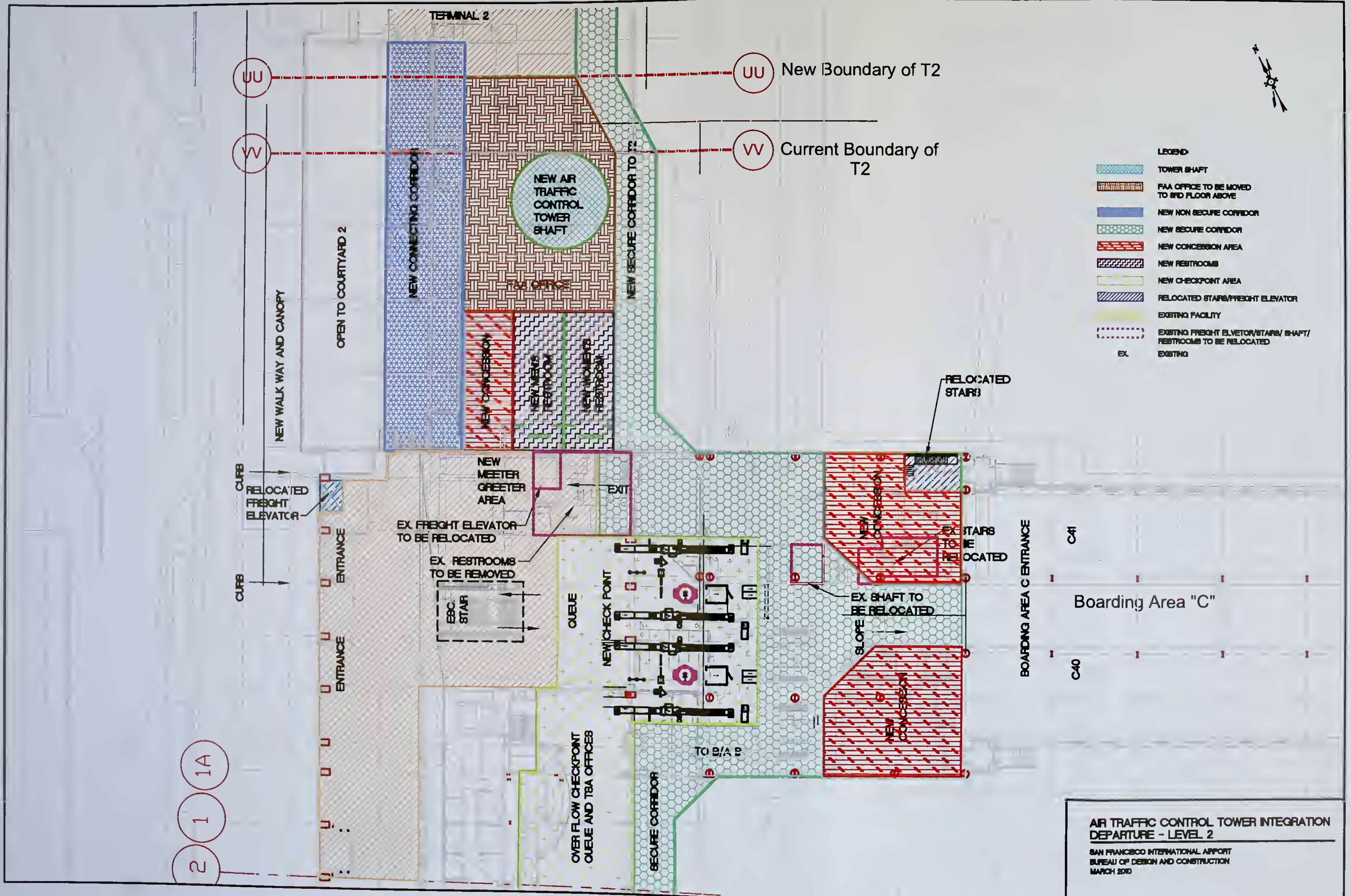
Appendix A

Proposed ATCT Floor Plans, Levels 1-3

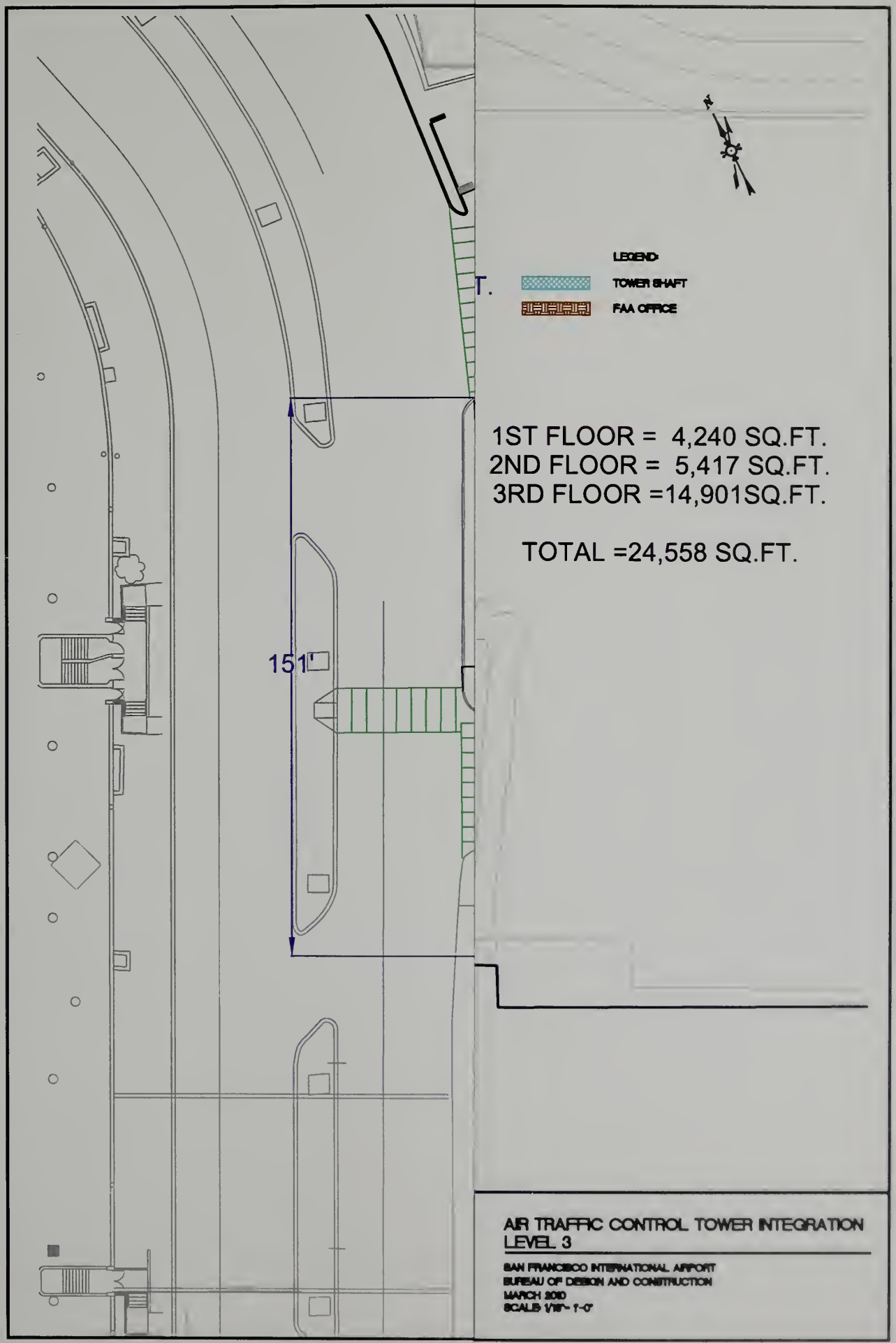

LEGEND:
TOWER SHAFT
FAA OFFICE
UU
VV
COURTYARD 2
TRUCK LOADING
TRUCK LOADING
RELOCATED FREIGHT ELEVATOR
AIR TRAFFIC CONTROL TOWER INTEGRATION
ARRIVAL - LEVEL 1
SAN FRANCISCO INTERNATIONAL AIRPORT
BUREAU OF DESIGN AND CONSTRUCTION
MARCH 2010
SCALE: 1/16" = 1'-0"

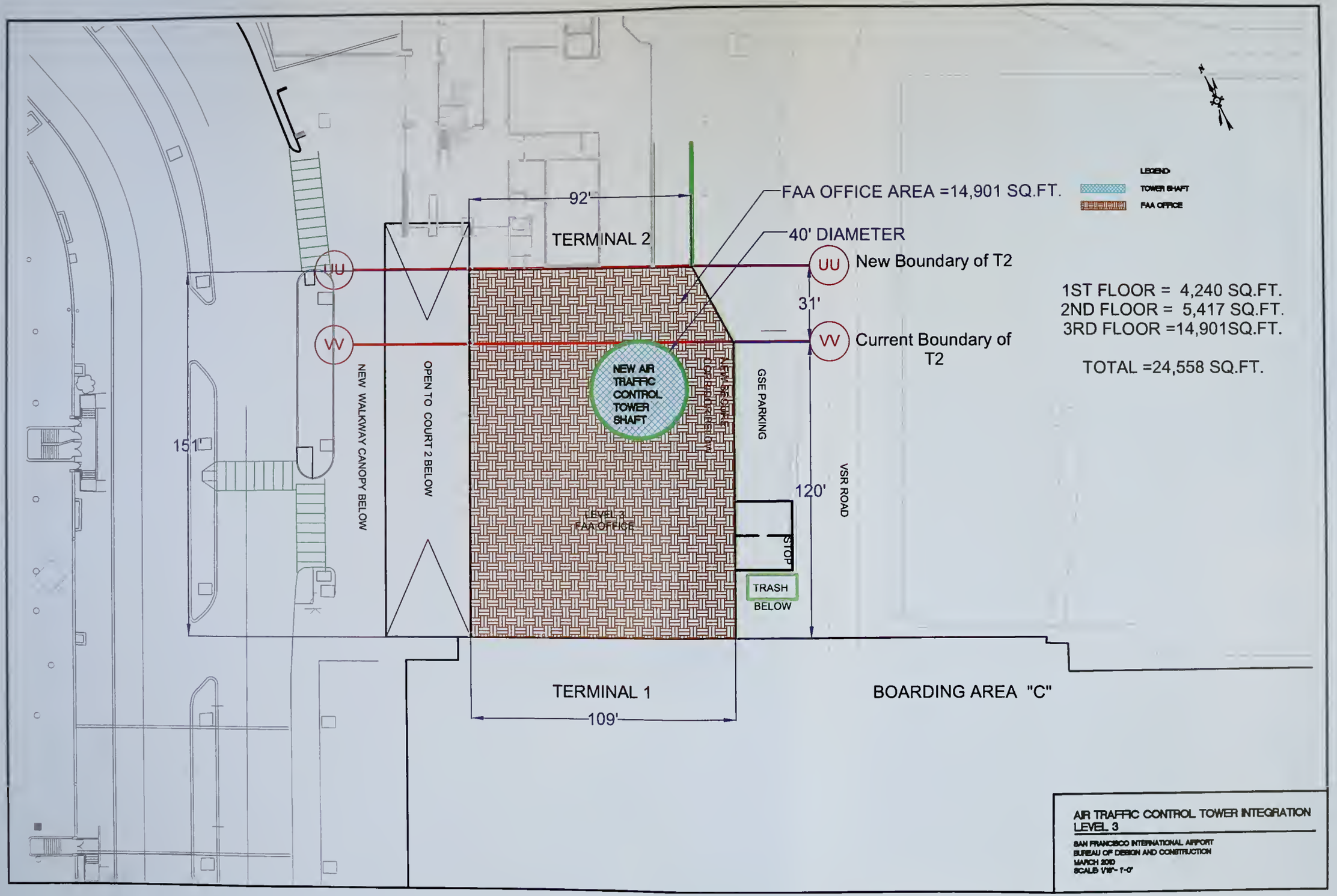

FAA OFFICE AREA = 5,417 SQ.FT.
45'
UU
New Boundary of T2
40' DIAMETER
VV
Current Boundary of T2
31'
95'
64'
NEW AIR TRAFFIC CONTROL TOWER SHAFT
FAA OFFICE
TERMINAL 2 ARRIVALS LEVEL
NEW CONNECTOR CORRIDOR ABOVE
COURTYARD 2
TRUCK LOADING
TRASH
GSE PARKING
VSR ROAD
COURT YARD
AOA ACCESS
SLIDING GATE
STOP
SFPD PARKING
78.0000
RELOCATED STAIRS
RELOCATED FREIGHT ELEVATOR
ESC. STAIR
LEGEND
TOWER SHAFT
FAA OFFICE
AIR TRAFFIC CONTROL TOWER INTEGRATION
ARRIVAL - LEVEL 1
SAN FRANCISCO INTERNATIONAL AIRPORT
BUREAU OF DESIGN AND CONSTRUCTION
MARCH 2010
SCALE: 1/16" = 1'-0"


UU
W
LEGEND
TOWER SHAFT
FAA OFFICE TO BE MOVED TO 3RD FLOOR ABOVE
NEW NON SECURE CORRIDOR
NEW SECURE CORRIDOR
NEW CONCESSION AREA
NEW RESTROOMS
NEW CHECKPOINT AREA
RELOCATED STAIRS/FREIGHT ELEVATOR
EXISTING FACILITY
EXISTING FREIGHT ELVETOR/STAIRS/ SHAFT/ RESTROOMS TO BE RELOCATED
EX. EXISTING
NEW WALK WAY AND CANOPY
CURB
RELOCATED FREIGHT ELEVATOR
CURB
arding Area "C"
1A
1
2
R TRAFFIC CONTROL TOWER INTEGRATION
EPARTURE - LEVEL 2
N FRANCISCO INTERNATIONAL AIRPORT
REAU OF DESIGN AND CONSTRUCTION
ARCH 2010



TERMINAL 2
UU
New Boundary of T2
VV
Current Boundary of T2
NEW AIR TRAFFIC CONTROL TOWER SHAFT
FAA OFFICE
NEW CONNECTING CORRIDOR
NEW SECURE CORRIDOR TO T2
OPEN TO COURTYARD 2
NEW WALK WAY AND CANOPY
NEW CONCESSION
NEW MEN'S RESTROOM
NEW WOMEN'S RESTROOM
NEW MEETER GREETER AREA
EXIT
CURB
RELOCATED FREIGHT ELEVATOR
EX. FREIGHT ELEVATOR TO BE RELOCATED
EX. RESTROOMS TO BE REMOVED
ENTRANCE
ESC. STAIR
QUEUE
NEW CHECK POINT
OVER FLOW CHECKPOINT QUEUE AND TSA OFFICES
SECURE CORRIDOR
TO B/A B
SLOPE
RELOCATED STAIRS
EX. STAIRS TO BE RELOCATED
EX. SHAFT TO BE RELOCATED
BOARDING AREA C ENTRANCE
Boarding Area "C"
C41
C40
1A
1
2
LEGEND:
TOWER SHAFT
FAA OFFICE TO BE MOVED TO 3RD FLOOR ABOVE
NEW NON SECURE CORRIDOR
NEW SECURE CORRIDOR
NEW CONCESSION AREA
NEW RESTROOMS
NEW CHECKPOINT AREA
RELOCATED STAIRS/FREIGHT ELEVATOR
EXISTING FACILITY
EXISTING FREIGHT ELEVATOR/STAIRS/ SHAFT/ RESTROOMS TO BE RELOCATED
EX. EXISTING
AIR TRAFFIC CONTROL TOWER INTEGRATION
DEPARTURE - LEVEL 2
SAN FRANCISCO INTERNATIONAL AIRPORT
BUREAU OF DESIGN AND CONSTRUCTION
MARCH 2010


LEGEND:
TOWER SHAFT
FAA OFFICE
T.
151'
1ST FLOOR = 4,240 SQ.FT.
2ND FLOOR = 5,417 SQ.FT.
3RD FLOOR =14,901SQ.FT.
TOTAL =24,558 SQ.FT.
AIR TRAFFIC CONTROL TOWER INTEGRATION
LEVEL 3
SAN FRANCISCO INTERNATIONAL AIRPORT
BUREAU OF DESIGN AND CONSTRUCTION
MARCH 2010
SCALE: 1/16"= 1'-0"


92'
TERMINAL 2
FAA OFFICE AREA =14,901 SQ.FT.
40' DIAMETER
LEGEND
TOWER SHAFT
FAA OFFICE
UU
New Boundary of T2
31'
VV
Current Boundary of T2
1ST FLOOR = 4,240 SQ.FT.
2ND FLOOR = 5,417 SQ.FT.
3RD FLOOR =14,901SQ.FT.
TOTAL =24,558 SQ.FT.
NEW AIR TRAFFIC CONTROL TOWER SHAFT
NEW WALKWAY CANOPY BELOW
OPEN TO COURT 2 BELOW
GSE PARKING
VSR ROAD
120'
151'
LEVEL 3 FAA OFFICE
STOP
TRASH BELOW
TERMINAL 1
109'
BOARDING AREA "C"
AIR TRAFFIC CONTROL TOWER INTEGRATION
LEVEL 3
SAN FRANCISCO INTERNATIONAL AIRPORT
BUREAU OF DESIGN AND CONSTRUCTION
MARCH 2010
SCALE 1/16"= 1'-0"

Appendix B

Noise Analysis

Appendix B. Noise Analysis Appendix

B.1 Introduction

This appendix presents the assumptions associated with existing and future noise conditions at San Francisco International Airport in terms of CNEL noise contours for the Environmental Assessment for the relocation of the Airport Traffic Control Tower (ATCT) at San Francisco International Airport (SFO).

B.2 Existing Baseline Noise Modeling Inputs

B.2.1 Existing Aircraft Operations

The existing noise environment for San Francisco International Airport was evaluated based upon the level of aircraft operations in 2010, and the associated airport operational characteristics; the baseline or existing noise exposure contour maps reflect annual conditions. The development of the baseline conditions used data from a variety of sources, including:

- Aircraft tower counts
- Aircraft situational display to industry (ASDI), for IFR aircraft
- Operations flight information and radar data from the Airport Noise and Operations Management System (ANOMS)
- Discussions with Airport Noise Abatement Office staff

Aircraft noise exposure maps were generated using the FAA's Integrated Noise Model (INM); INM version 7.0b was used for this Environmental Assessment (EA). The INM computer model requires a variety of operational data to evaluate the noise environment around an airport. These data include the following information, which are discussed in detail in the following paragraphs:

- Total aircraft activity levels
- Aircraft fleet mix categories
- Detailed aircraft fleet mix
- Time of day
- Runway use
- Departure and arrival procedures
- Flight paths
- Flight path utilization

B.2.1.1 Total Aircraft Activity Levels

The total aircraft operational levels were derived directly from the FAA's ATCT activity data, called tower counts. The tower count data showed that, for 2010, there were a total of 387,248 operations, or an average of 1,061 operations per day (an operation is one takeoff or one landing). **Table B-1** summarizes the tower count operational data for 2010.

Table B-1

Airport Tower Counts for Baseline Period (2010)

Category	Annual Operations	Average Daily Operations
Air Carrier	288,475	790.3
Air Taxi	83,493	229.7
Civil	12,570	34.4
Military	2,710	7.4
TOTAL	387,248	1,060.9

Source: San Francisco International Airport, February 2011.
Prepared by: BridgeNet International, February 2011.

B.2.2 Aircraft Fleet Mix Categories

Breakdowns by aircraft fleet mix are presented within this section, with further refinements of these categories in the subsequent section, *Detailed Aircraft Fleet Mix*. Aircraft fleet mix categories are defined relative to type of aircraft (i.e., jet or propeller), as well as size and noise characteristics. The categories were determined from the San Francisco International Airport's ANOMS data and ASDI radar data sources. **Table B-2** presents operations for the different categories of aircraft. It is not possible to definitively categorize all of the operations into unique groups, although the following aircraft groupings do generally define the categories of operations that occur at the Airport and that were used within this study.

Table B-2

Operations by Aircraft Category – 2010 Baseline Period

Aircraft Category	Daily Operations	Annual Operations
Wide body (Long-haul)	84.8	30,953
Wide body (Medium-haul)	47.3	17,279
Narrowbody (Quieter)	420.9	153,631
Narrowbody (B757)	115.9	42,304
Narrowbody (Louder)	21.5	7,854
Regional Jet	171.4	62,570
Commuter Propeller	120.9	44,139
Business Jet (Large)	25.0	9,119
Business Jet (Med/Small)	26.7	9,737
General Aviation (Propeller)	13.5	4,931
Military (Fixed wing)	3.3	1,188
Helicopters (Civil and Military)	9.7	3,541
Total	1,061.0	387,248

Source: BridgeNet International, February 2011.
Prepared by: BridgeNet International, February 2011.

B.2.3 Detailed Aircraft Fleet Mix

The specific mix of aircraft that operate at the Airport is one of the most important airport noise exposure factors. The fleet mix assumptions are presented in **Table B-3**. This table presents the average daily operations for each type of aircraft used in the INM noise model, as well as a description of these aircraft.

The aircraft fleet mix data reported in the previously identified sources does not identify the specific engine type used on each aircraft, which is required for noise modeling with INM. Therefore, it was necessary to assign an INM aircraft type. For instance, an aircraft could be equipped with one of three different engines; each has a different noise profile. The INM aircraft type assigned for each of the aircraft operating at San Francisco International Airport was based upon the INM type that most closely matched the type of aircraft (and aircraft/engine combination) that operates at the Airport. Some aircraft with smaller numbers of operations were grouped into the aircraft type that was most representative of the characteristics of that aircraft. In addition, some aircraft types are not in the model and are assigned a type that the FAA has determined to most closely match that aircraft. For example, the CRJ700 is not in the INM model; the FAA states to use the CRJ900 as a substitution aircraft for the CRJ700. For this EA, the following INM aircraft substitutions were approved by the FAA:

Aircraft	Aircraft INM Substitution	Reason
Boeing 747-8	B747-400	INM v7.0b does not have a 747-8 aircraft. The FAA recommends the B747-400 as a substitute aircraft.
Boeing 787	Airbus A-330	INM v7.0b does not have a B-787 aircraft profile; the A-330 most closely matches the anticipated noise profile of the B-787 and recommended by the FAA.

Table B-3

Detailed Operations by INM Aircraft Type - 2010 Baseline Period

INM Type	Category	2010 Daily Operations	2010 Annual Operations
74720B	Widebody	0.16	57
747400	Long-Haul	41.19	15,033
777200		23.93	8,733
777300		13.54	4,944
A330-301		1.27	462
A340-211		4.73	1,725
A380			
747-8 (747400)			
787-8 (A330-301)			
767300	Widebody	32.06	11,704
767400	Medium-Haul	0.08	30
767CF6		11.55	4,216
A300-622R		0.18	67
A310-304		1.99	725
DC1030		0.69	253
MD11PW		0.78	284
7373B2	Narrowbody	21.10	7,700
737400	(Quieter)	6.62	2,418
737500		3.70	1,351
737700		72.09	26,311
737800		41.20	15,039
737900		16.00	5,841
MD9028		1.31	480
A319-131		97.65	35,643
A320-211		150.77	55,031
A321-232		10.46	3,817
757PW	Narrowbody	97.62	35,631
757RR	(757)	10.01	3,653
757300		8.27	3,020
DC95HW	Narrowbody	0.05	18
MD83	(Louder)	21.47	7,835
CL601 (CRJ2)	Regional Jet	75.39	27,516
CRJ9-ER		81.09	29,596
EMB145		1.02	373
EMB190 (EMB14L)		13.93	5,085
HS748A	Commuter	0.74	271
1900D		1.68	612
DHC8400		1.50	549
EMB120		117.01	42,707

Table B-3 (continued)
Detailed Operations by INM Aircraft Type - 2010 Baseline Period

INM Type	Category	2010 Daily Operations	2010 Annual Operations
CL600	Business Jet	8.42	3,072
CNA750	(Large)	5.62	2,049
GIIB		0.82	298
GIV		10.14	3,700
CIT3	Business Jet	2.34	855
CNA55B	(Med/small)	9.05	3,303
IA1125		4.24	1,547
LEAR35		6.80	2,481
SABR80		4.25	1,551
BEC58P	General Aviation	1.71	626
CNA441	(Propeller)	4.28	1,563
GASEPV		7.51	2,742
C130	Military	1.04	381
C17		1.06	387
F-18		1.15	420
HELO (mil/civil)	Helocopter	9.70	3,541
Total		**1060.95**	**387,248**

Source: BridgeNet International, February 2011.
Prepared by: BridgeNet International, February 2011.

B.2.4 Time of Day

In the CNEL metric, a 24-hour day is broken down into day, evening, and night. Evening is defined as 7 p.m. to 10 p.m., and aircraft are penalized by adding 5 dBA to each operation; nighttime is defined as 10 p.m. to 7 a.m., and operations are penalized 10 dBA.

For the 2010 base period, the overall percentage of ***evening*** operations at San Francisco International Airport was 16 percent; ***nighttime*** operations at San Francisco International Airport were 14 percent, as summarized in **Table B-4**. Of the 1,061 average daily operations, 169 occurred in the evening hours between 7 p.m. and 10 p.m., while 153 operations occurred between 10 p.m. and 7 a.m. The specific percentages of daytime, evening, and nighttime of the INM categories are presented in detail in **Table B-5**.

Table B-4

Summary of Operations by Time of Day (2010)

Time of Day	Arrival	Departure
Day	70%	69%
Evening	19%	13%
Night	11%	17%

Source: BridgeNet International, February 2011.
Prepared by: BridgeNet International, February 2011.

B.2.5 Runway Use

An additional, important consideration in developing the noise exposure contours is the percentage of time each runway is used. The speed and direction of the wind dictate the direction in which the runways are operated (north versus south). In general, aircraft operate into the wind – departing into the wind and arriving into the wind. When the wind direction changes, operations are shifted to the runway end that favors the new wind direction.

At San Francisco International Airport many other factors also influence which runway is utilized. The aircraft fleet mix has different runway uses based upon aircraft size, performance, and operation type. These factors include:

- Wind speed and direction
- Required runway length for departure by aircraft type and weight
- Noise abatement procedures
- Airport operational efficiency
- Interaction with other bay area airports
- Weather minimums
- Terrain and obstacle clearance

The existing runway use percentages presented in **Table B-6** are based upon a full year of 2010 ANOMS data. The table presents the percentage that each runway was used during the daytime, evening, and nighttime hours.

Table B-5

Detailed Operations by Time of Day (2010)

INM Type	Category	2010 Daily Opeations	2010 Annual Operations	Percent					
				Daily Arrivals			Daily Departures		
				Day	Evening	Night	Day	Evening	Night
74720B	Widebody	0.16	57	50%		50%	50%	13%	38%
747400	Long-haul	41.19	15,033	77%	10%	13%	43%	12%	44%
777200		23.93	8,733	59%	29%	12%	56%	19%	24%
777300		13.54	4,944	86%	14%	0%	41%	15%	44%
A330-301		1.27	462	98%		2%	100%		
A340-211		4.73	1,725	78%	21%	1%	33%	59%	7%
A380				77%	10%	13%	48%	12%	40%
747-8 (747400)				77%	10%	13%	48%	12%	40%
787-8 (A330-301)				59%	29%	12%	56%	19%	24%
767300	Widebody	32.06	11,704	55%	34%	12%	63%	14%	23%
767400	Medium-haul	0.08	30	50%	25%	25%	50%	25%	25%
767CF6		11.55	4,216	49%	18%	33%	49%	13%	38%
A300-622R		0.18	67	53%	11%	42%	11%	53%	32%
A310-304		1.99	725	49%	1%	49%	9%	48%	42%
DC1030		0.69	253	49%	3%	46%	23%	49%	29%
MD11PW		0.78	284	99%			96%	3%	3%
7373B2	Narrowbody	21.10	7,700	73%	19%	8%	72%	20%	8%
737400	(Quieter)	6.62	2,418	81%	15%	3%	82%	15%	2%
737500		3.70	1,351	63%	24%	14%	77%	13%	10%
737700		72.09	26,311	65%	20%	15%	71%	16%	12%
737800		41.20	15,039	67%	18%	15%	76%	8%	16%
737900		16.00	5,841	69%	23%	9%	73%	15%	12%
MD9028		1.31	480	58%	12%	30%	65%		35%
A319-131		97.65	35,643	68%	20%	12%	70%	11%	19%
A320-211		150.77	55,031	68%	19%	13%	67%	10%	23%
A321-232		10.46	3,817	42%	50%	7%	56%	8%	36%
757PW	Narrowbody	97.62	35,631	68%	19%	13%	73%	7%	19%
757RR	(757)	10.01	3,653	31%	29%	40%	50%	7%	43%
757300		8.27	3,020	55%	18%	27%	75%	3%	22%
DC95HW	Narrowbody	0.05	18	100%			100%		
MD83	(Louder)	21.47	7,835	74%	21%	5%	62%	5%	33%
CL601 (CRJ2)	Regional Jet	75.39	27,516	76%	16%	7%	70%	22%	9%
CRJ9-ER		81.09	29,596	77%	17%	6%	76%	17%	8%
EMB145		1.02	373	81%	10%	10%	81%	12%	8%
EMB190 (EMB14L)		13.93	5,085	79%	15%	6%	82%	17%	1%
HS748A	Commuter	0.74	271	88%	8%	3%	79%	11%	11%
1900D		1.68	612	61%	13%	25%	60%	14%	25%
DHC8400		1.50	549	91%	8%	1%	90%		9%
EMB120		117.01	42,707	74%	16%	10%	75%	15%	10%
CL600	Business Jet	8.42	3,072	84%	12%	4%	88%	7%	5%
CNA750	(Large)	5.62	2,049	79%	14%	7%	87%	6%	6%
GIIB		0.82	298	81%	11%	8%	82%	10%	8%
GIV		10.14	3,700	81%	12%	6%	88%	5%	7%

Table B-5 (continued)

Detailed Operations by Time of Day (2010)

INM Type	Category	2010 Daily Opeations	2010 Annual Operations	Percent					
				Daily Arrivals			Daily Departures		
				Day	Evening	Night	Day	Evening	Night
CIT3	Business Jet	2.34	855	72%	17%	10%	84%	12%	5%
CNA55B	(Med/small)	9.05	3,303	77%	14%	8%	83%	9%	8%
IA1125		4.24	1,547	80%	13%	8%	84%	9%	7%
LEAR35		6.80	2,481	83%	10%	7%	86%	7%	7%
SABR80		4.25	1,551	82%	11%	7%	88%	7%	6%
BEC58P	General Aviation	1.71	626	56%	20%	25%	49%	21%	29%
CNA441	(Propeller)	4.28	1,563	70%	17%	13%	61%	17%	21%
GASEPV		7.51	2,742	80%	11%	9%	75%	12%	13%
C130	Military	1.04	381	100%			100%		
C17		1.06	387	100%			100%		
F-18		1.15	420	100%			100%		
HELO (mil/civil)	Helocopter	9.70	3,541	73%	12%	15%	75%	14%	11%

Source: BridgeNet International, February 2011.
Prepared by: BridgeNet International, February 2011.

Table B-6

Runway Use Assumptions per Aircraft Category (2010)

Aircraft Category	Oper	01L	19R	01R	19L	10L	28R	10R	28L
Day and Evening Departures									
Wide Body (Long Haul)	D	0.2%		4.2%	0.3%	6.0%	53.4%	1.4%	34.5%
Wide Body (Medium Haul)	D	2.1%	0.7%	38.9%		4.6%	13.6%	3.5%	36.6%
Narrow Body (Quieter/B757)	D	32.1%	1.0%	42.5%		2.3%	4.1%	4.9%	13.1%
Narrow Body (Louder)	D	25.5%	1.2%	46.2%		2.9%	3.6%	6.9%	13.6%
Regional Jets	D	25.8%	1.1%	52.1%		1.5%	3.7%	5.2%	10.6%
Commuter Props	D	52.8%	0.7%	24.8%		0.9%	5.1%	5.4%	10.2%
Business Jets	D	25.3%	0.7%	35.1%		6.0%	27.5%	0.3%	5.2%
Smaller Propeller GA	D	19.7%	1.1%	35.0%		3.5%	31.1%	1.4%	8.2%
Military	D			16.7%		16.7%	55.6%		11.1%
Night Departures									
Wide Body (Long Haul)	D	0.9%		5.5%		13.6%	55.5%	5.1%	19.4%
Wide Body (Medium Haul)	D	20.1%	0.5%	48.8%		3.3%	4.1%	11.0%	12.2%
Narrow Body (Quieter/B757)	D	25.3%	0.4%	52.0%		1.6%	1.5%	6.2%	13.0%
Narrow Body (Louder)	D	21.6%	0.4%	51.3%		1.1%	1.1%	10.7%	13.7%
Regional Jets	D	15.4%	0.9%	63.2%		1.5%	1.3%	7.3%	10.4%
Commuter Props	D	74.1%	0.8%	5.4%			2.5%	7.2%	9.9%
Business Jets	D	16.8%	0.3%	22.9%		16.0%	37.0%	1.3%	5.7%
Smaller Propeller GA	D	30.7%	0.5%	7.7%		17.5%	26.0%	9.6%	7.9%
Military	D			100.0%					
Day and Evening Arrivals									
Wide Body (Long Haul)	A				8.5%	0.2%	39.0%		52.4%
Wide Body (Medium Haul)	A				7.7%	0.1%	56.5%		35.6%
Narrow Body (Quieter/B757)	A		1.1%		6.3%	0.1%	55.7%		36.9%
Narrow Body (Louder)	A		1.6%		8.4%	0.2%	57.1%		32.7%
Regional Jets	A		1.9%		5.7%	0.1%	47.6%		44.6%
Commuter Props	A		1.8%		4.8%	0.1%	42.6%		50.7%
Business Jets	A		1.7%		4.0%	0.1%	78.5%		15.7%
Smaller Propeller GA	A		1.8%		3.4%	0.2%	80.9%		13.7%
Military	A				5.3%		78.9%		15.8%
Night Arrivals									
Wide Body (Long Haul)	A				6.6%	0.2%	76.9%		16.2%
Wide Body (Medium Haul)	A				6.2%	0.2%	73.2%		20.3%
Narrow Body (Quieter/B757)	A				8.8%	0.0%	73.8%		17.4%
Narrow Body (Louder)	A		2.4%		12.1%		67.5%		18.0%
Regional Jets	A		1.4%		9.9%	0.1%	66.2%		22.4%
Commuter Props	A		1.8%		9.6%	0.2%	64.0%		24.5%
Business Jets	A		1.5%		5.8%		84.2%		8.5%
Smaller Propeller GA	A		2.6%		2.6%	0.4%	82.7%		11.8%
Military	A						100.0%		

Source: San Francisco International Airport, February 2011; BridgeNet International, February 2011.
Prepared by: BridgeNet International, February 2011.

For this study, the runway use was determined for each category of aircraft for the day, evening, and night periods. The most common operational configuration is to arrive on Runways 28L/R and to depart on Runways 01L/R. Large, heavy aircraft often need a longer runway for departure than Runways 01L/01R and will takeoff off on Runway 28R. The second most common operational configuration is to arrive and depart on Runways 28L/R. The third most common operational configuration is to arrive on Runways 19L/R and to departure on Runways 10L/10R. All other configurations are rare and are only used when strong wind conditions dictate the use of those flow conditions.

B.2.6 Flight Paths/Tracks and Flight Path Use

The FAA has established procedures (oftentimes referred to as flight tracks) for aircraft arriving and departing from San Francisco International Airport. These conventional procedures are not precisely defined ground tracks, but represent a path along the ground over which aircraft generally fly. With more modern procedures that utilize GPS navigation, they are becoming more defined paths. The identification of the location and use of the flight path is based upon radar data from the ANOMS noise monitoring system and ASDI data that identify the procedure being flown by each aircraft. A full year of radar data from both sources for 2010 was used to determine the baseline arrival and departure flight paths and flight path use.

In the development of the existing noise contours, the INM noise model requires aggregating the flight paths into a set of generalized flight tracks of aircraft operating at the Airport. In the INM noise model, a flight track consists of a backbone or center flight path, and the dispersion, or spread, of all flights that use the backbone. This dispersion includes ancillary flight tracks to the backbone; for the San Francisco International Airport ATCT EA, each flight track has one backbone and four ancillary flight tracks, two on either side of the backbone. The backbone and ancillary tracks were each assigned a percentage of the operations.

Flight tracks for different operational conditions are presented in the following exhibits. INM flight paths are show in **Exhibits A1** through **A4** for arrivals and departures, respectively. Flight tracks from actual aircraft operations are depicted in **Exhibits A5** through **A12**. The exhibits are presented as follows:

INM Flight Tracks

Figure A1 – Arrival all Runways
Figure A2 – Departure Runways 28 L/R
Figure A3 – Departure Runways 10 L/R
Figure A4 – Departure Runways 01 L/R and 19 L/R

Arrival Radar Flight Tracks

Figure A5 – Runways 28 L/R
Figure A6 – Runways 10 L/R
Figure A7 – Runways 01 L/R
Figure A8 – Runways 19 L/R

Departure Radar Flight Tracks

Figure A9 – Runways 28 L/R
Figure A10 – Runways 10 L/R
Figure A11 – Runways 01 L/R
Figure A12 – Runways 19 L/R

The INM modeling analysis for existing conditions included a total of 52 departure flight tracks and 28 arrival flight tracks. For the INM study, the flight tracks are modeled in the terminal airspace, or within approximately 10 miles of the airport, well beyond the area of the noise contour.

B.2.7 Climb Profile Analysis

Standard INM inputs use stage length to determine the departure profiles. Changes to the airline industry, including higher aircraft load factors, have had an effect on how aircraft fly. This is illustrated by the total number of passenger enplanements and operations. At San Francisco International Airport, both enplanements and operations were approximately 12% lower in 2007 than in 2000. Since the events of Sept. 11, 2001, passenger enplanements started showing a steady increase in 2003 to present, and total operations did not show an increase until 2006 (0.1% growth, 2005-2006).

Higher load factors result in heavier aircraft flying on shorter haul routes that were traditionally operated with much lower load factors. For example, aircraft flying from SFO to LAX are considered a Stage 1 aircraft, which is a flight between 0 – 499 nautical miles (NM). Due to higher load factors, this departure profile could be a Stage 2 or Stage 3, which represents an aircraft stage length of 500 – 999 and 1,000 – 1,499 NM, respectively. The INM determines that aircraft with longer stage lengths will be heavier. Where approved by the FAA, this study will use actual radar climb profile data to assign the most appropriate standard stage length to each flight. The flight profiles used in this study are not custom, rather a more appropriate use of the standard Stage 1 – 9 INM-defined stages based upon the actual profile flown. This was approved for use with the Boeing 737-3/4/5, Boeing 777, and MD80 aircraft.

B.3 Existing Baseline Noise Conditions

Based upon the operational conditions presented above and the INM noise model, noise contours were developed. As required by the FAA, the primary noise criterion to describe the existing noise environment is CNEL.

CNEL Noise Contours. The existing (2010) CNEL noise exposure contours for San Francisco International Airport are presented in the Environmental Assessment document. This figure shows the 65 CNEL, 70 CNEL, and 75 CNEL noise exposure contours. **Table B-7** presents the size of each of the CNEL noise contours in terms of acres. These were obtained from the output of the INM noise model.

Table B-7

Size of Noise Contour – Acres (2010)

DNL	2010
	Acres
65	7,625.4
70	3,027.7
75	1,181.1

Source: San Francisco International Airport, February 2011; BridgeNet International, February 2011.
Prepared by: BridgeNet International, February 2011.

B.4 Future Noise Modeling Inputs

The Environmental Assessment evaluated the potential impacts from the ATCT relocation project for 2018. Aircraft operations are the same for the No Action and with project (Proposed Action) scenarios.

B.4.1 2018 Aircraft Operations

The future noise environment for San Francisco International Airport was analyzed based upon operational conditions in the year 2018. The forecast is based upon the approved Aviation Demand Forecast (February 2010) prepared by Jacobs Consultancy. The forecast data shows a total of 424,640 annual operations are anticipated to occur at the Airport in 2018. This equates to an average of 1,163 operations per day (an operation is either one takeoff or one landing) in 2018.

B.4.1.1 Aircraft Fleet Mix Categories

Categories of aircraft fleet mix were defined relative to the type of aircraft categories that were used to categorize existing operations. The breakdown by these categories was determined from the Jacobs Consultancy aviation forecast. **Table B-8** presents operations for the different categories of aircraft for the 2018 time period.

Table B-8

Operations by Aircraft Category for Future Conditions

	2018	
Aircraft Category	Daily Operations	Annual Operations
Wide body (Long-haul)	132.2	48,238
Wide body (Medium-haul)	57.1	20,830
Narrowbody (Quieter)	579.7	211,589
Narrowbody (B757)	60.1	21,926
Narrowbody (Louder)	25.0	9,136
Regional Jet	186.2	67,972
Commuter Propeller	47.1	17,176
Business Jet (Large)	27.0	9,867
Business Jet (Med/Small)	29.0	10,598
General Aviation (Propeller)	10.0	3,654
Military (Fixed wing)	6.0	2,193
Helicopters (Civil/Military)	4.0	1,462
Total	1,163.4	424,640

Source: BridgeNet International, February 2011.
Prepared by: BridgeNet International, February 2011.

B.4.1.2 Detailed Aircraft Fleet Mix

The mix of aircraft that operate at the Airport is one of the most important factors in terms of the noise environment. Fleet mix data were determined from the Jacobs Consultancy forecast that identified different types of aircraft for the future years 2013, 2018, and 2023. This study used the data for the 2018 forecast. The fleet mix assumptions are presented in **Table B-9**. This table presents the average daily operations for each type of aircraft used in the INM, as well as a description of these aircraft categories.

Table B-9

Detailed Operations by Aircraft Type for Future Conditions

INM Type	Category	2010 Daily Operations	Jacobs Forecast Operations		
			2013	2018	2023
74720B	Widebody	0.16	1.00	1.00	1.00
747400	Long-haul	41.19	45.97	35.04	30.04
777200		23.93	31.98	37.04	59.08
777300		13.54	6.99	17.02	25.03
A330-301		1.27	4.00	4.00	4.01
A340-211		4.73	4.00	4.00	4.01
A380			1.00	1.00	1.00
747-8 (747400)			2.00	10.01	17.02
787-8 (A330-301)			8.99	23.03	43.06
767300	Widebody	32.06	35.97	40.05	19.03
767400	Medium-haul	0.08	1.00	2.00	2.00
767CF6		11.55	6.00	4.00	2.00
A300-622R		0.18	1.00	1.00	1.00
A310-304		1.99	1.00	1.00	1.00
DC1030		0.69	2.00	1.00	1.00
MD11PW		0.78	6.99	8.01	11.02
7373B2	Narrowbody	21.10	30.86	15.46	8.07
737400	(Quieter)	6.62	9.69	4.86	2.53
737500		3.70	5.41	2.71	1.42
737700		72.09	76.94	94.11	113.16
737800		41.20	44.97	60.07	77.11
737900		16.00	25.98	43.05	60.08
MD9028		1.31	2.00	2.00	1.00
A319-131		97.65	127.91	158.19	195.27
A320-211		150.77	149.89	185.22	218.30
A321-232		10.46	12.99	14.02	15.02
757PW	Narrowbody	97.62	70.93	43.73	3.64
757RR	(757)	10.01	7.01	4.33	0.36
757300		8.27	10.99	12.01	12.02
DC95HW	Narrowbody	0.05	1.00	2.00	-
MD83	(Louder)	21.47	32.98	23.03	12.02
CL601 (CRJ2)	Regional Jet	75.39	26.98	12.01	-
CRJ9-ER		81.09	108.92	132.16	170.23
EMB145		1.02	9.99	8.01	6.01
EMB190 (EMB14L)		13.93	28.98	34.04	35.05
HS748A	Commuter	0.74	-	-	-
1900D		1.68	-	-	-
DHC8400		1.50	5.00	12.01	12.02
EMB120		117.01	64.95	35.04	-

Table B-9 (continued)

Detailed Operations by Aircraft Type for Future Conditions

INM Type	Category	2010 Daily Operations	Jacobs Forecast Operations 2013	2018	2023
CL600	Business Jet	8.42	8.08	9.11	11.81
CNA750	(Large)	5.62	5.39	6.08	7.88
GIIB		0.82	0.78	0.88	1.14
GIV		10.14	9.73	10.97	14.22
CIT3	Business Jet	2.34	2.28	2.55	2.99
CNA55B	(Med/small)	9.05	8.81	9.85	11.55
IA1125		4.24	4.13	4.61	5.41
LEAR35		6.80	6.62	7.40	8.67
SABR80		4.25	4.14	4.63	5.42
BEC58P	General Aviation	1.71	4.00	4.00	2.00
CNA441	(Propeller)	4.28	4.00	4.00	2.00
GASEPV		7.51	2.00	2.00	1.00
C130	Military	1.04	1.00	1.00	1.00
C17		1.06	1.00	1.00	1.00
F-18		1.15	4.00	4.00	4.01
HELO (mil/civil)	Helocopter	9.70	4.00	4.00	4.01
Total		**1060.95**	**1,084.22**	**1,163.40**	**1,248.71**

Source: BridgeNet International, February 2011.
Prepared by: BridgeNet International, February 2011.

The INM aircraft type assigned to each of the aircraft operating at SFO was based upon aircraft in the INM database that most closely matched the forecast. Some aircraft with smaller numbers of operations were grouped into the aircraft type that most closely represented those aircraft.

B.4.2 Additional Operational Assumptions

Assumptions such as runway use, time of day, flight tracks and flight track usage, and departure procedures remain the same as with the existing conditions.

B.5 Future 2018 Noise Conditions

Future noise contours were developed using cumulative noise levels (i.e., averaged over a period of time). As required by the FAA, the primary noise criterion to describe the future noise environment is the cumulative measure commonly referred to as CNEL.

CNEL Noise Contours. The future 2018 baseline CNEL noise exposure contours for San Francisco International Airport are presented in the main body of the environmental document. This figure presents the 65 CNEL, 70 CNEL, and 75 CNEL noise contours. **Table B-10** presents the size of each of the CNEL noise contours in terms of acres. The study assumes that there are no changes to the operational assumptions at the Airport. All assumptions are assumed to be the same as the No Action conditions.

Table B-10

Size of Noise Contour – Acres (2018 with and without Project)

DNL	2018
	Acres
65	9,123.1
70	3,725.1
75	1,499.3

Source: San Francisco International Airport, February 2011; BridgeNet International, February 2011.
Prepared by: BridgeNet International, February 2011.

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Figure A1
Arrival Flight Tracks (INM)

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

- Main Track
- Sub Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

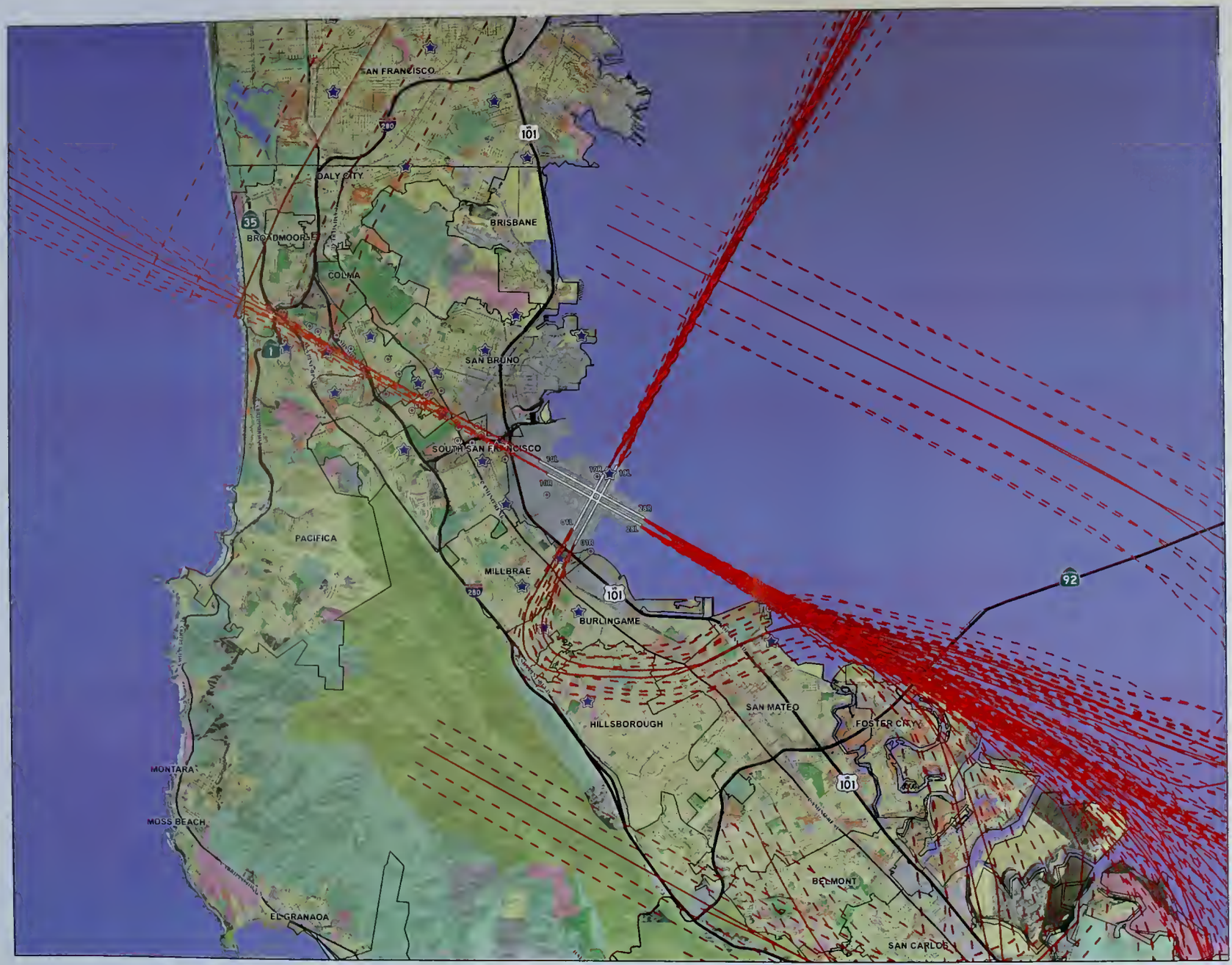

Figure A1
Arrival Flight Tracks (INM)

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

- Main Track
- Sub Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

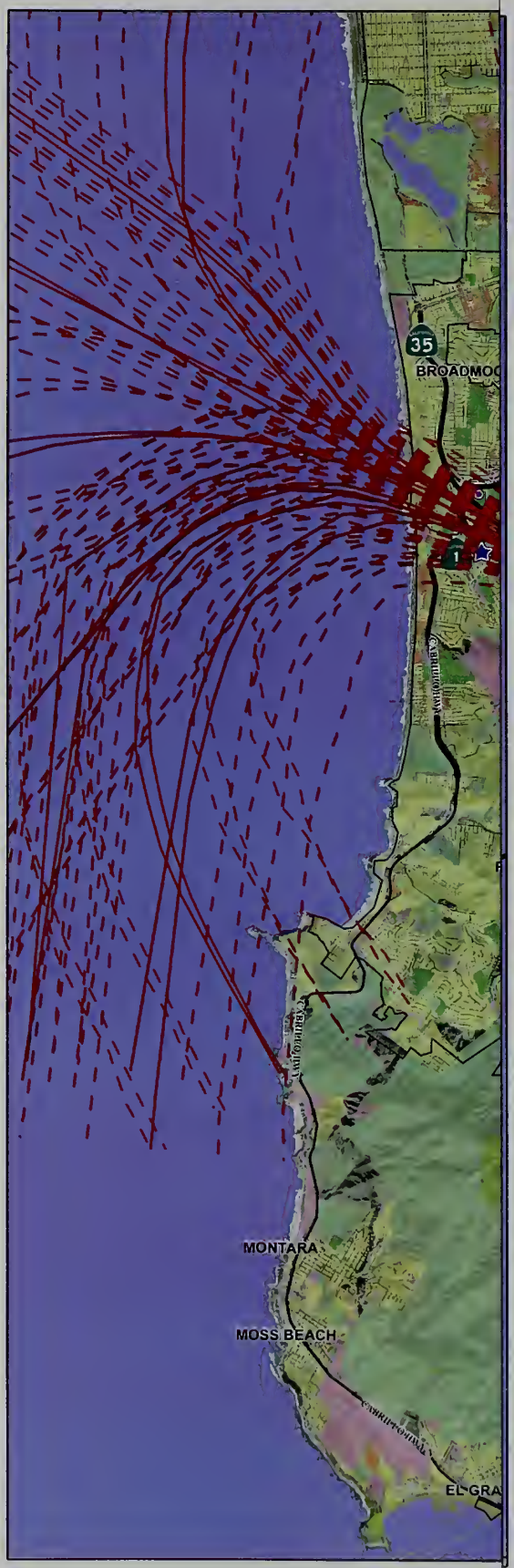

Figure A2
Departure Flight Tracks (INM)
Runway 28 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

- Main Track
- Sub Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

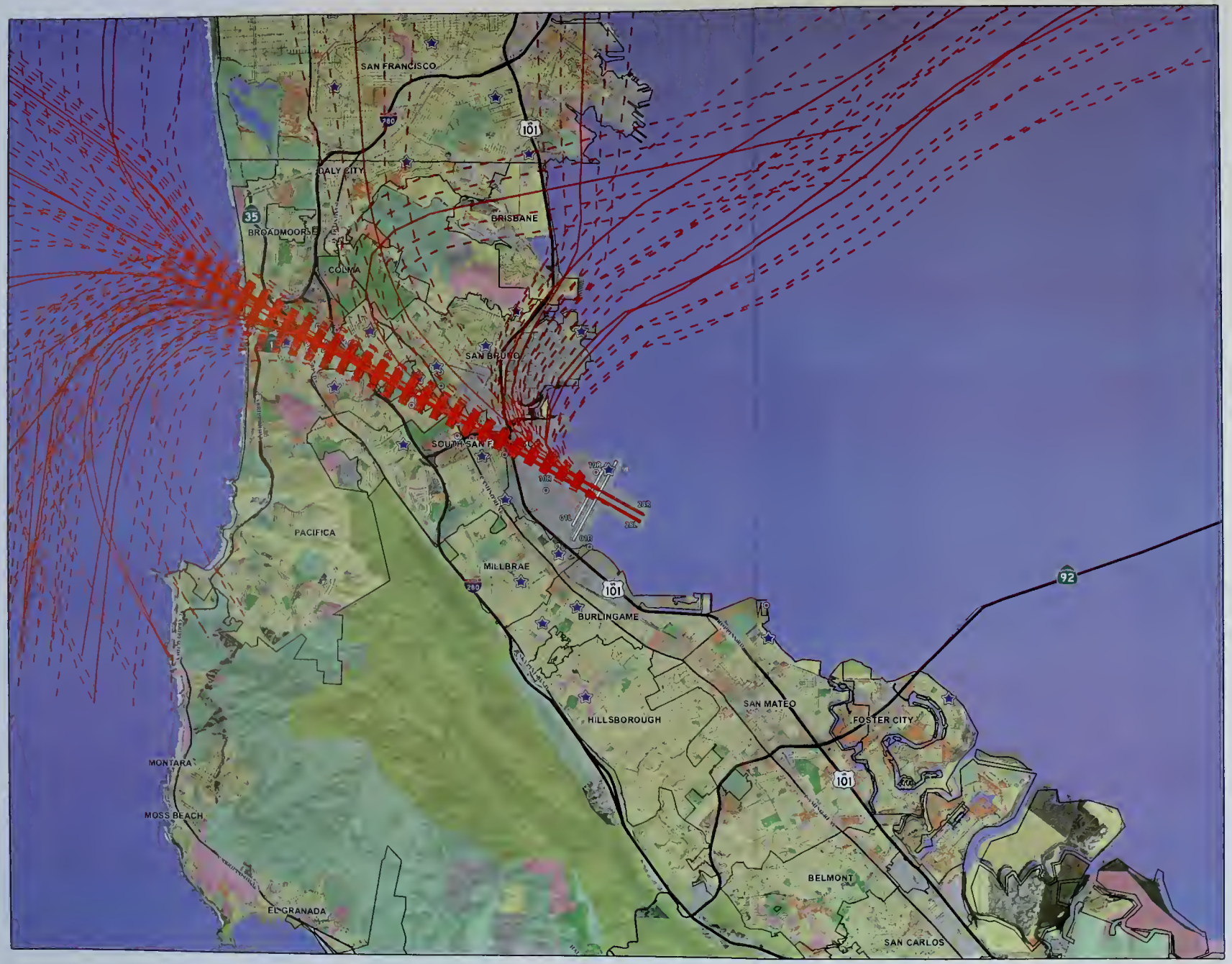

Figure A2
Departure Flight Tracks (INM)
Runway 28 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

- Main Track
- Sub Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

Figure A3
Departure Flight Tracks (INM)
Runway 10 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

- Main Track
- Sub Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

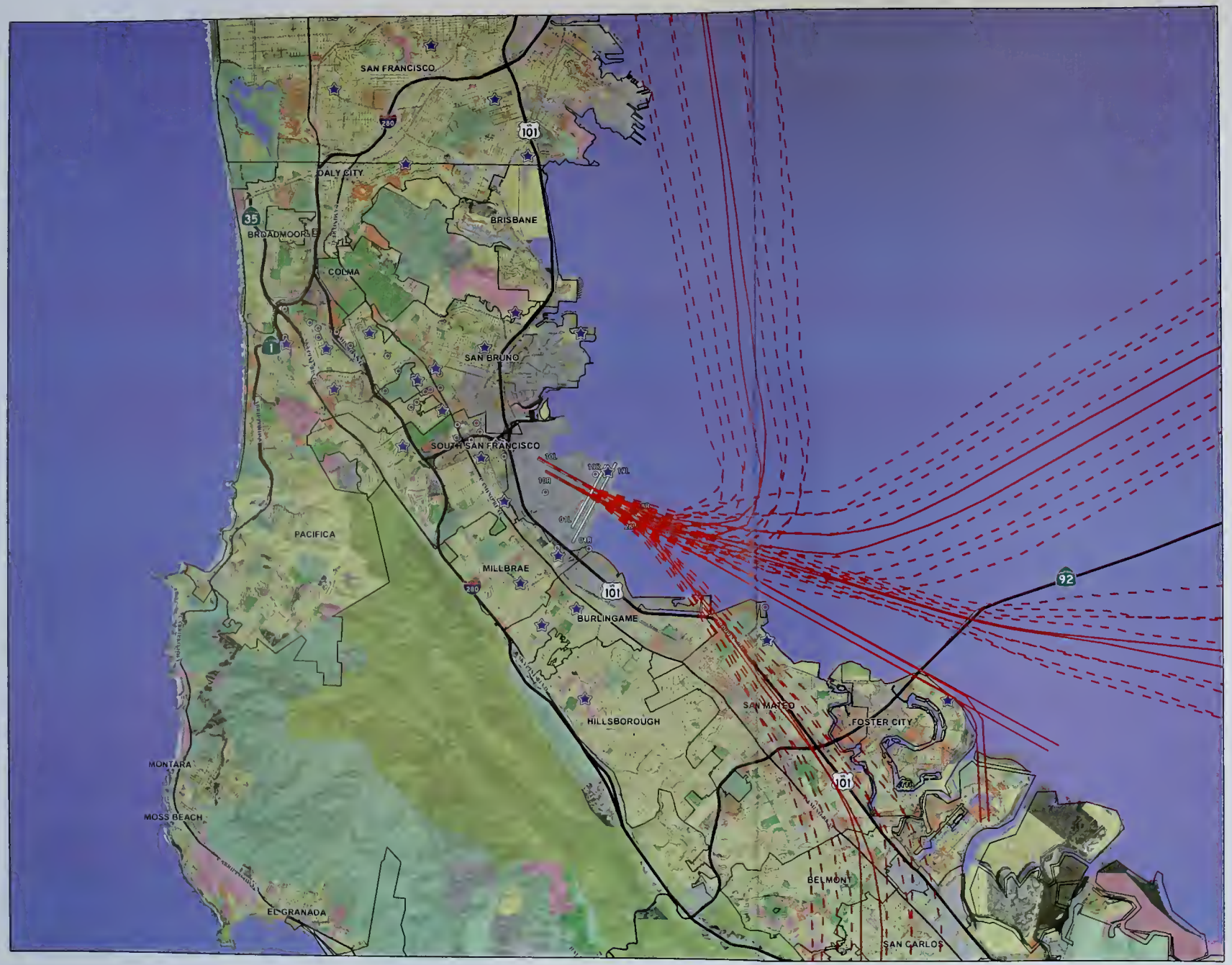

Figure A3
Departure Flight Tracks (INM)
Runway 10 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

- Main Track
- Sub Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

Figure A4
Departure Flight Tracks (INM)
Runway 01 L/R & Runway 19 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

- Main Track
- Sub Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

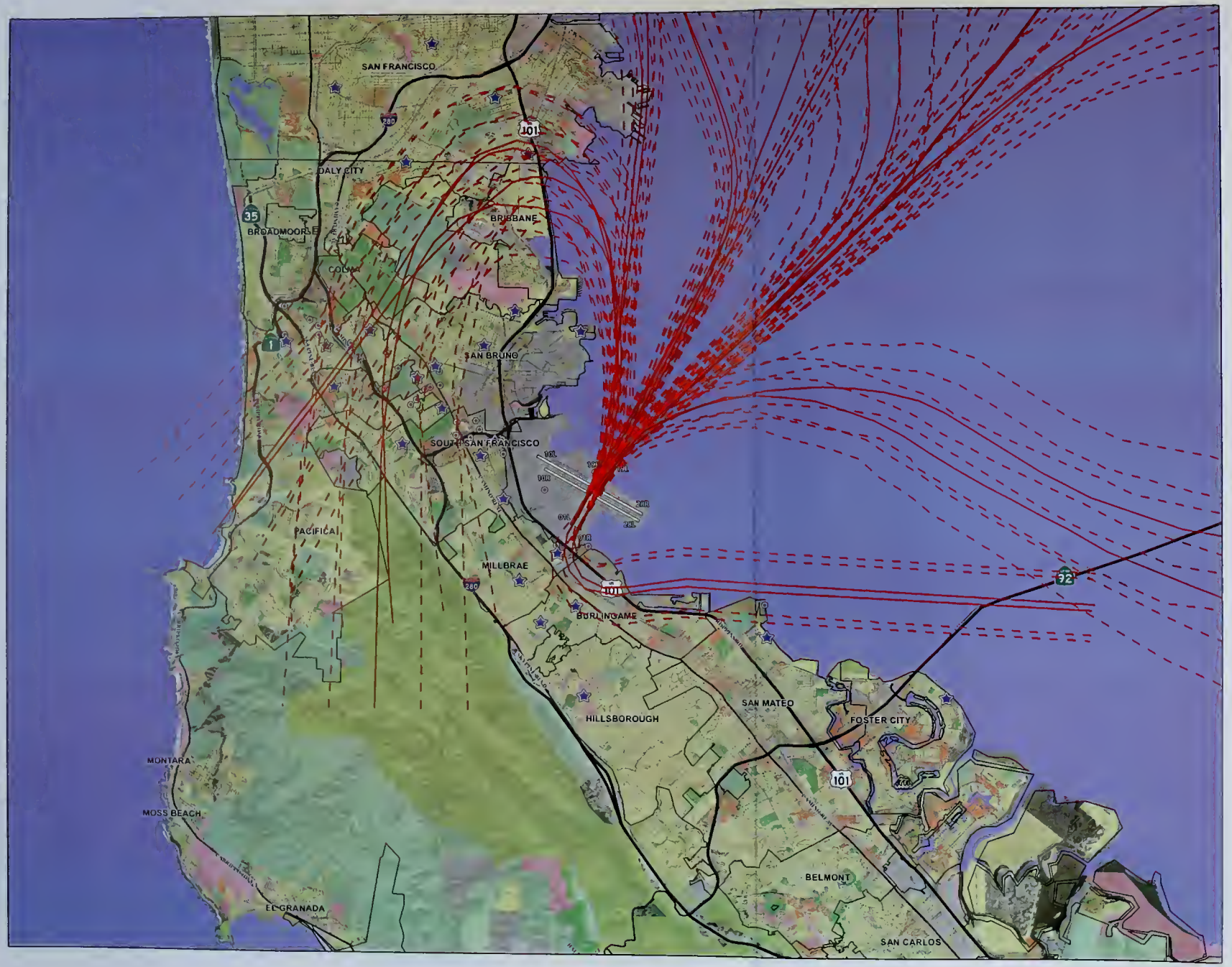

Figure A4
Departure Flight Tracks (INM)
Runway 01 L/R & Runway 19 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

- Main Track
- Sub Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

Figure A5
Arrival Flight Tracks (Radar)
Runway 28 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

Radar Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

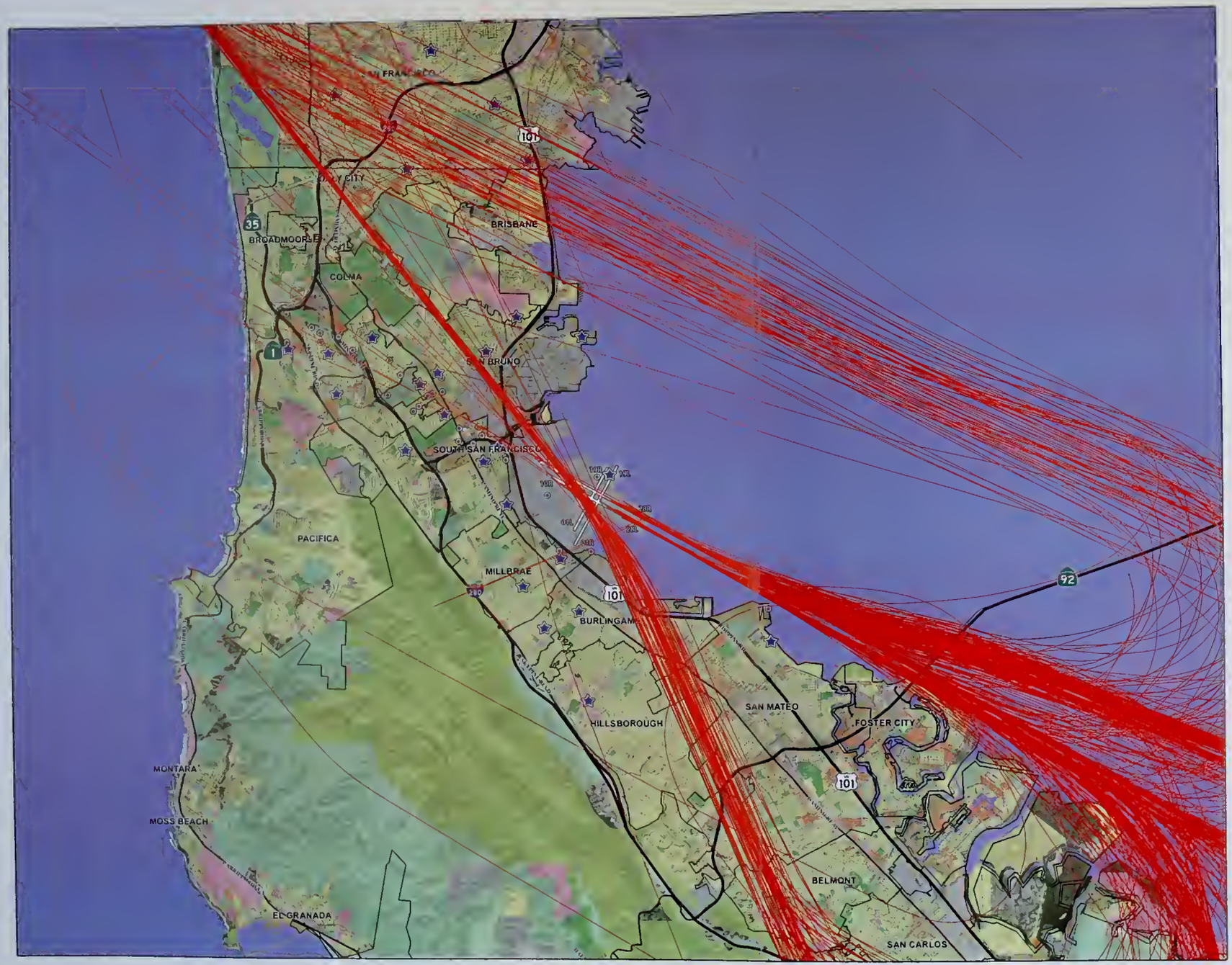

Figure A5
Arrival Flight Tracks (Radar)
Runway 28 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

Radar Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

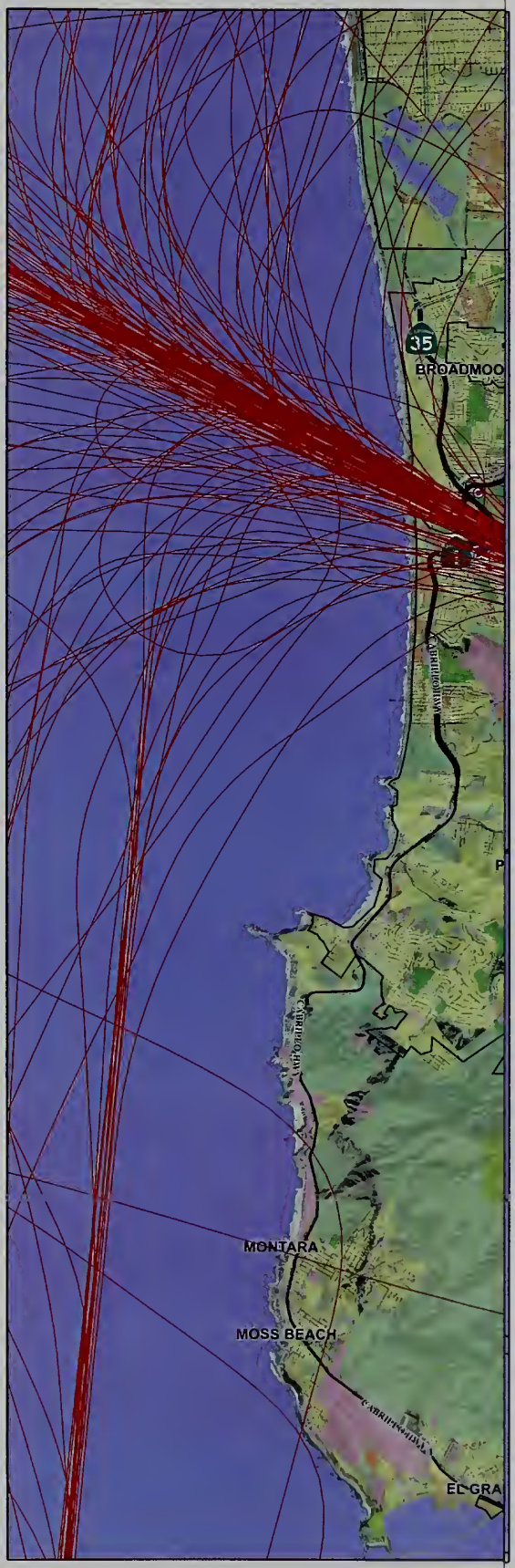

Figure A6
Arrival Flight Tracks (Radar)
Runway 10 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

Radar Track

N

0 1 2 4 miles

SFO

San Francisco International Airport

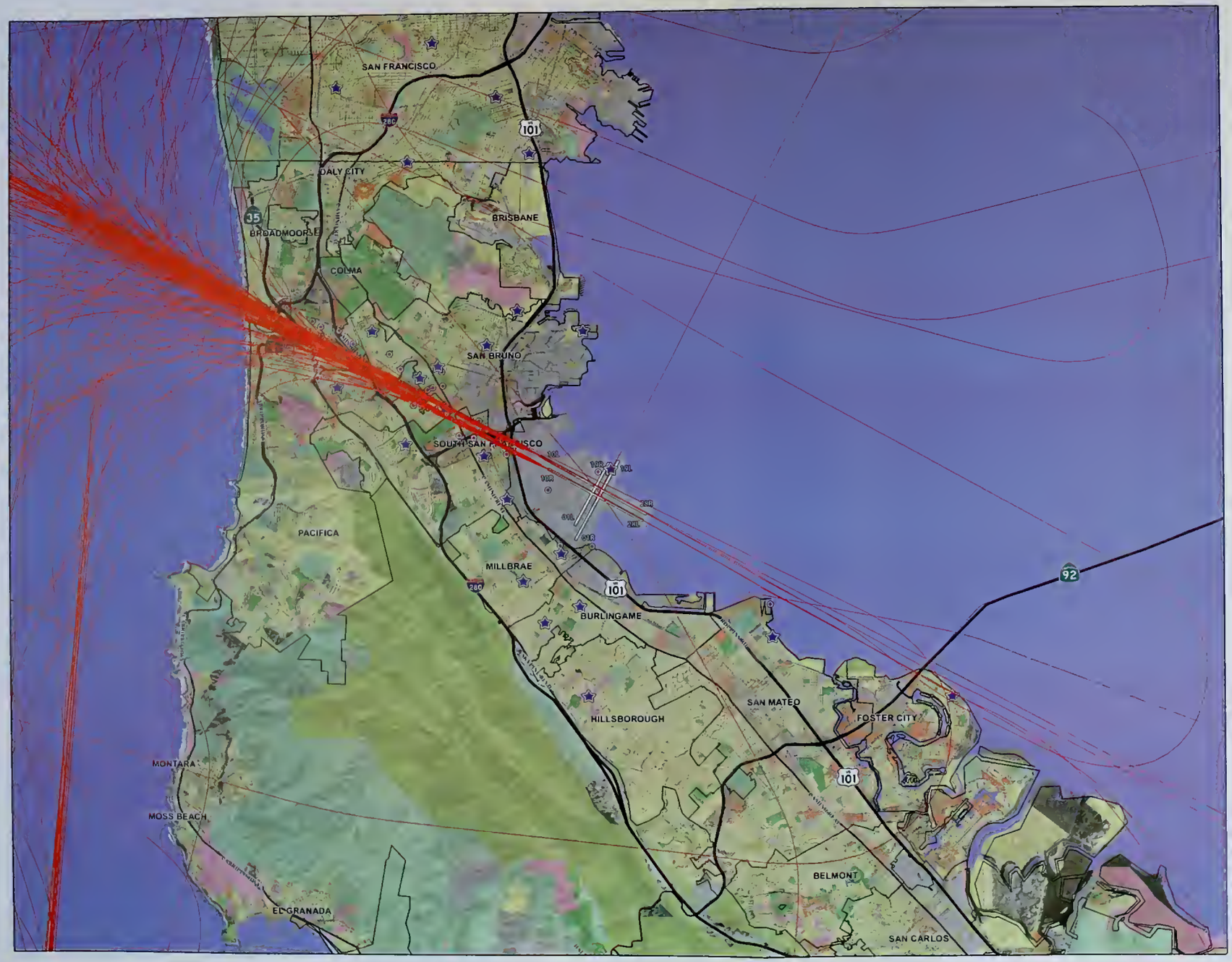

Figure A6
Arrival Flight Tracks (Radar)
Runway 10 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

Radar Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

Figure A7
Arrival Flight Tracks (Radar)
Runway 01 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

Radar Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

Figure A7
Arrival Flight Tracks (Radar)
Runway 01 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

Radar Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

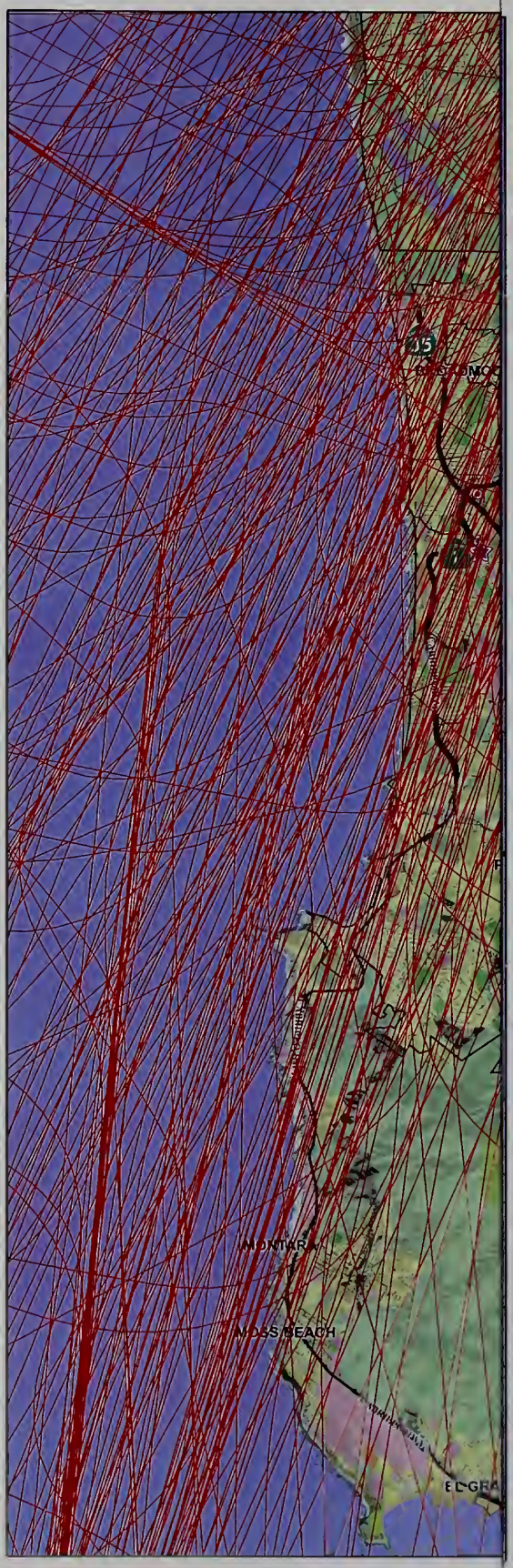

Figure A8
Arrival Flight Tracks (Radar)
Runway 19 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

Radar Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

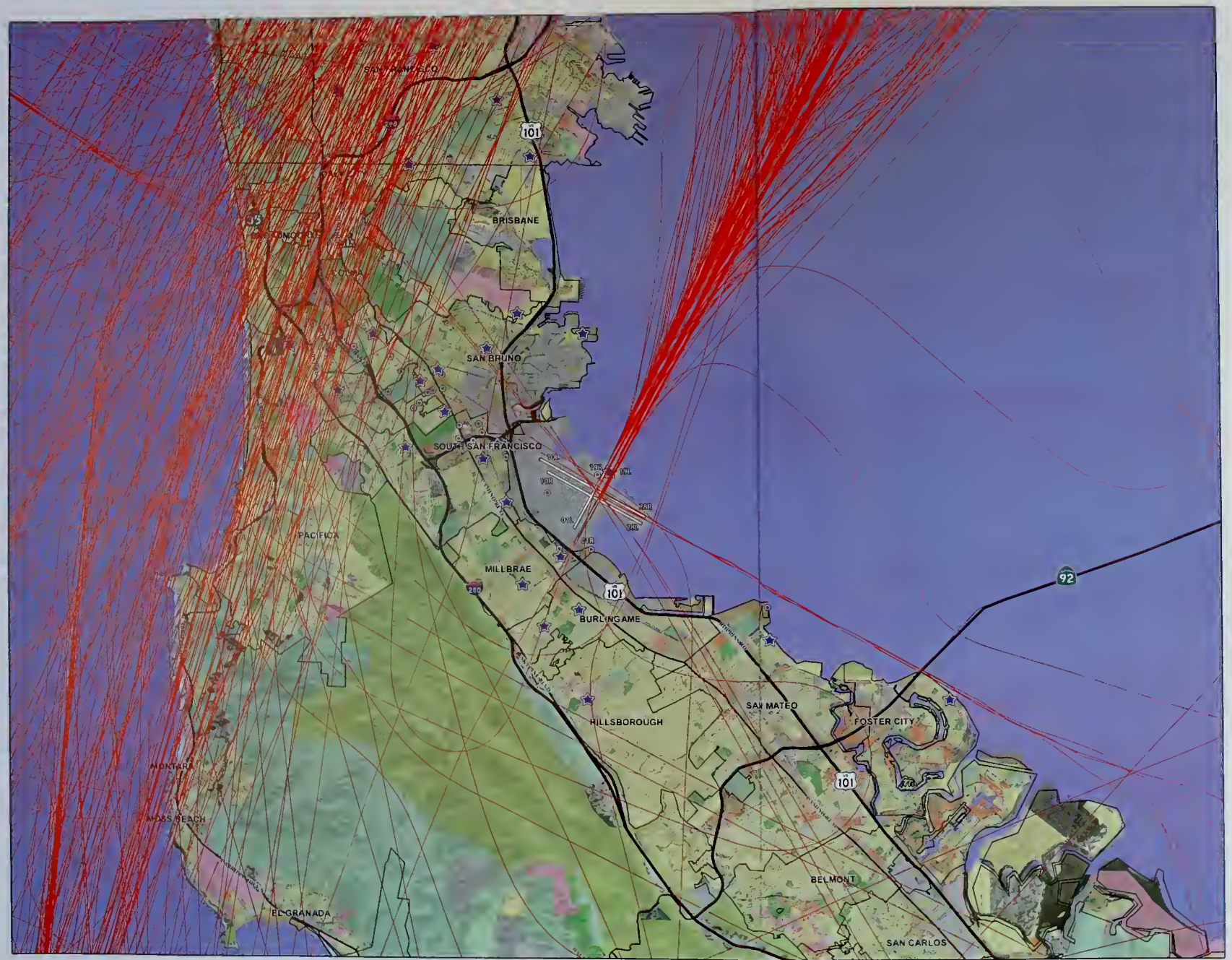

Figure A8
Arrival Flight Tracks (Radar)
Runway 19 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

Radar Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

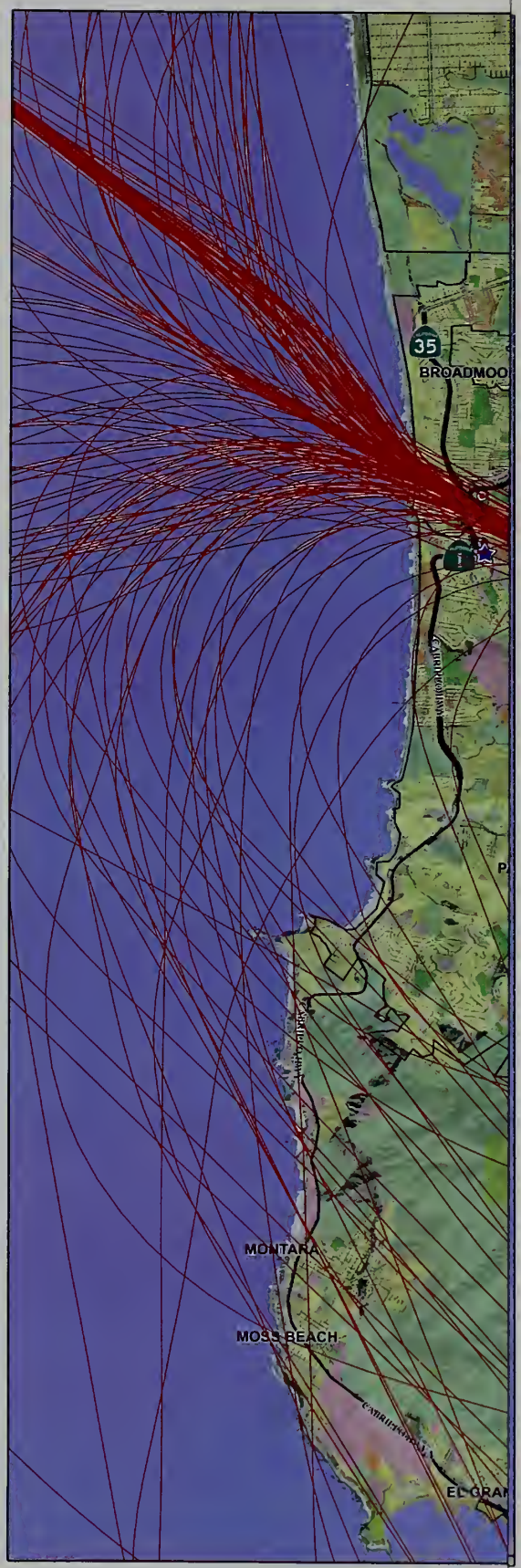

Figure A9
Departure Flight Tracks (Radar)
Runway 28 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

Radar Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

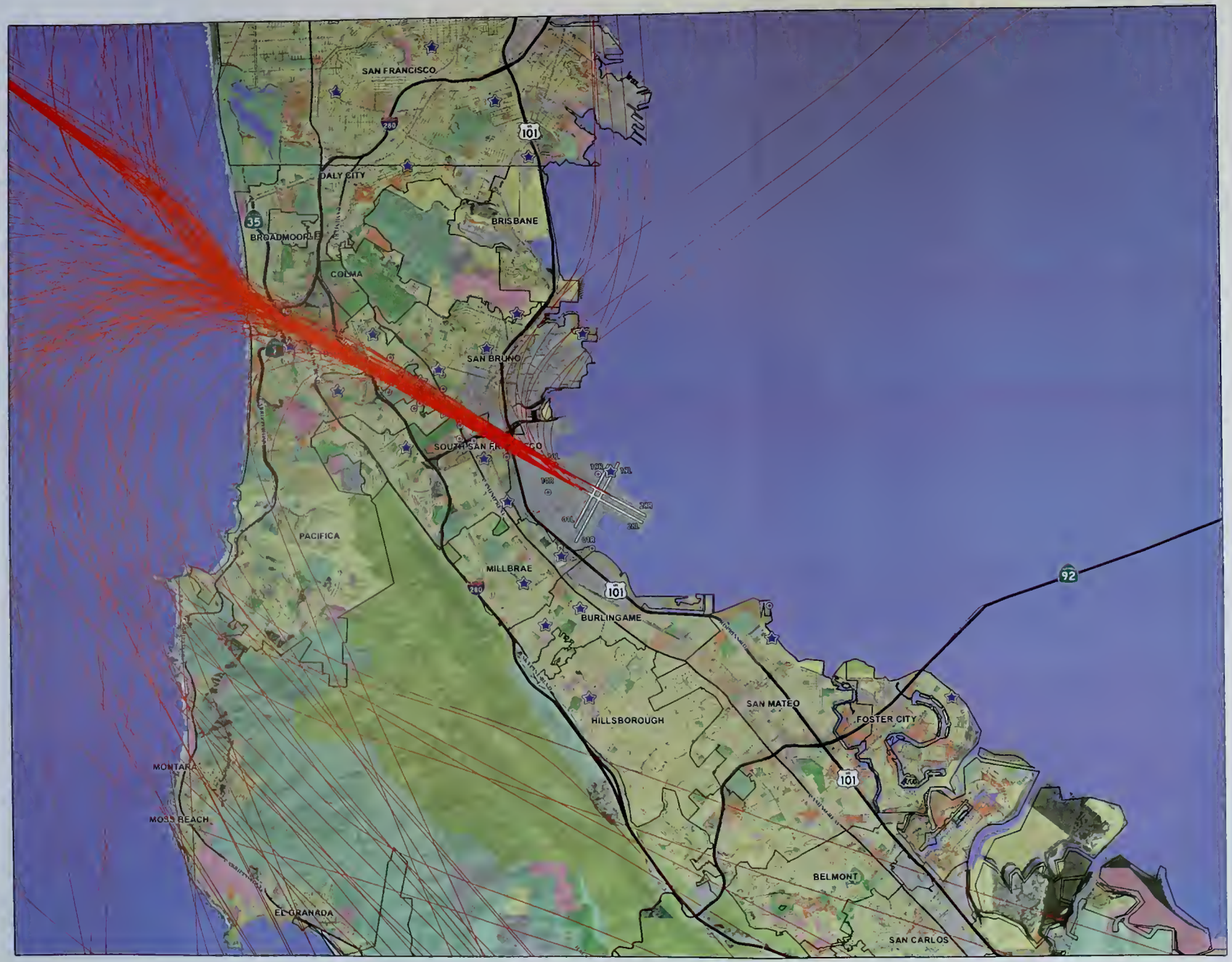

Figure A9
Departure Flight Tracks (Radar)
Runway 28 L/R

SFO
San Francisco International Airport

Figure A10
Departure Flight Tracks (Radar)
Runway 10 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

Radar Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

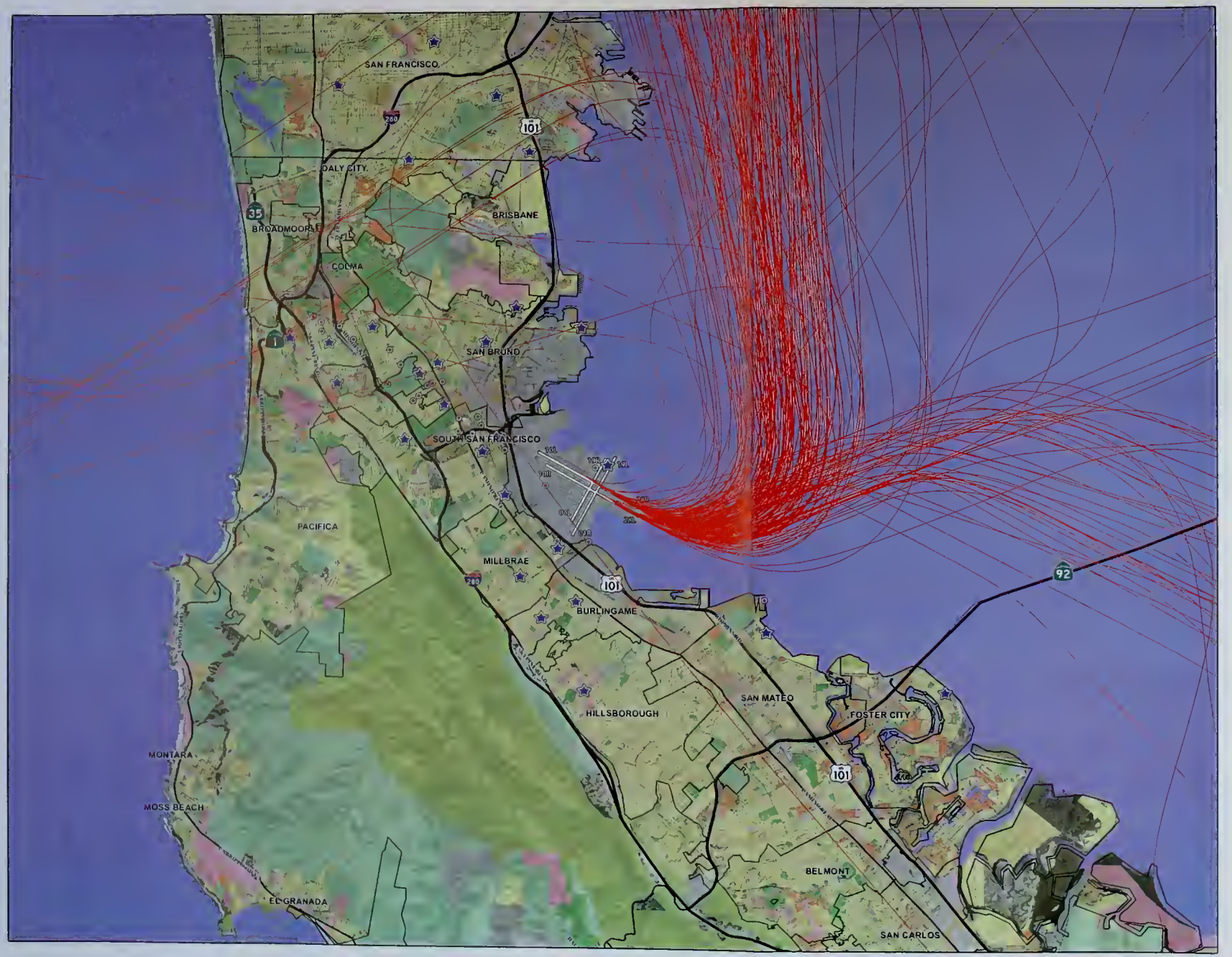

Figure A10
Departure Flight Tracks (Radar)
Runway 10 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

Radar Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

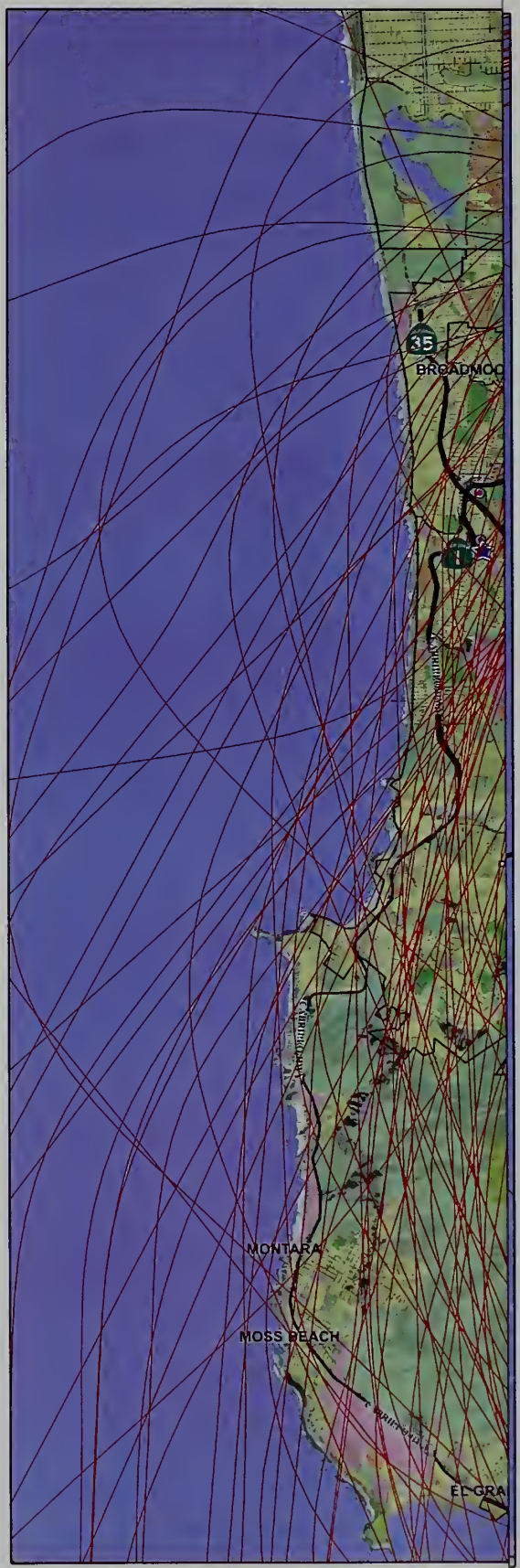

Figure A11
Departure Flight Tracks (Radar)
Runway 01 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

Radar Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

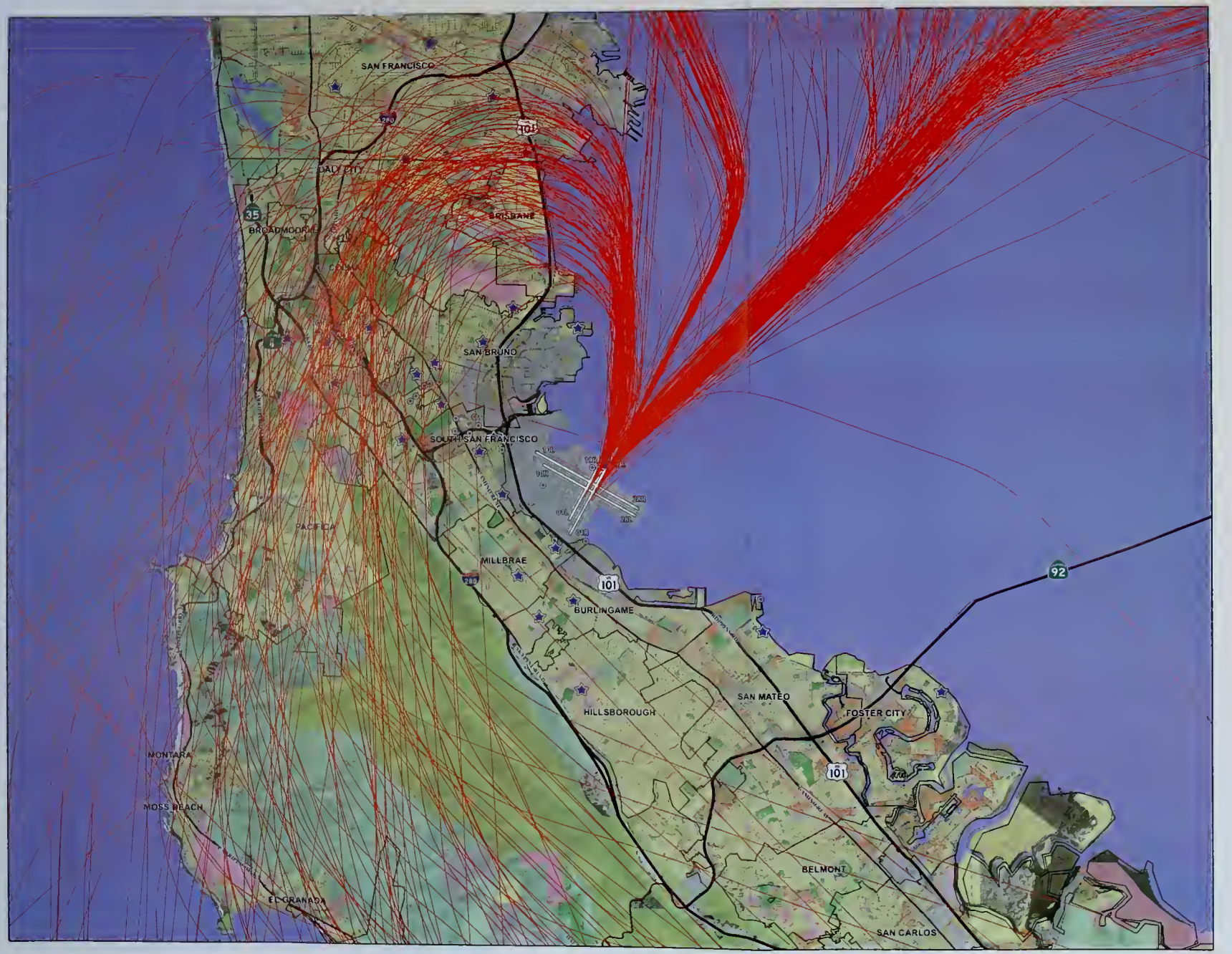

Figure A11
Departure Flight Tracks (Radar)
Runway 01 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

Radar Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

Figure A12
Departure Flight Tracks (Radar)
Runway 19 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

Radar Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

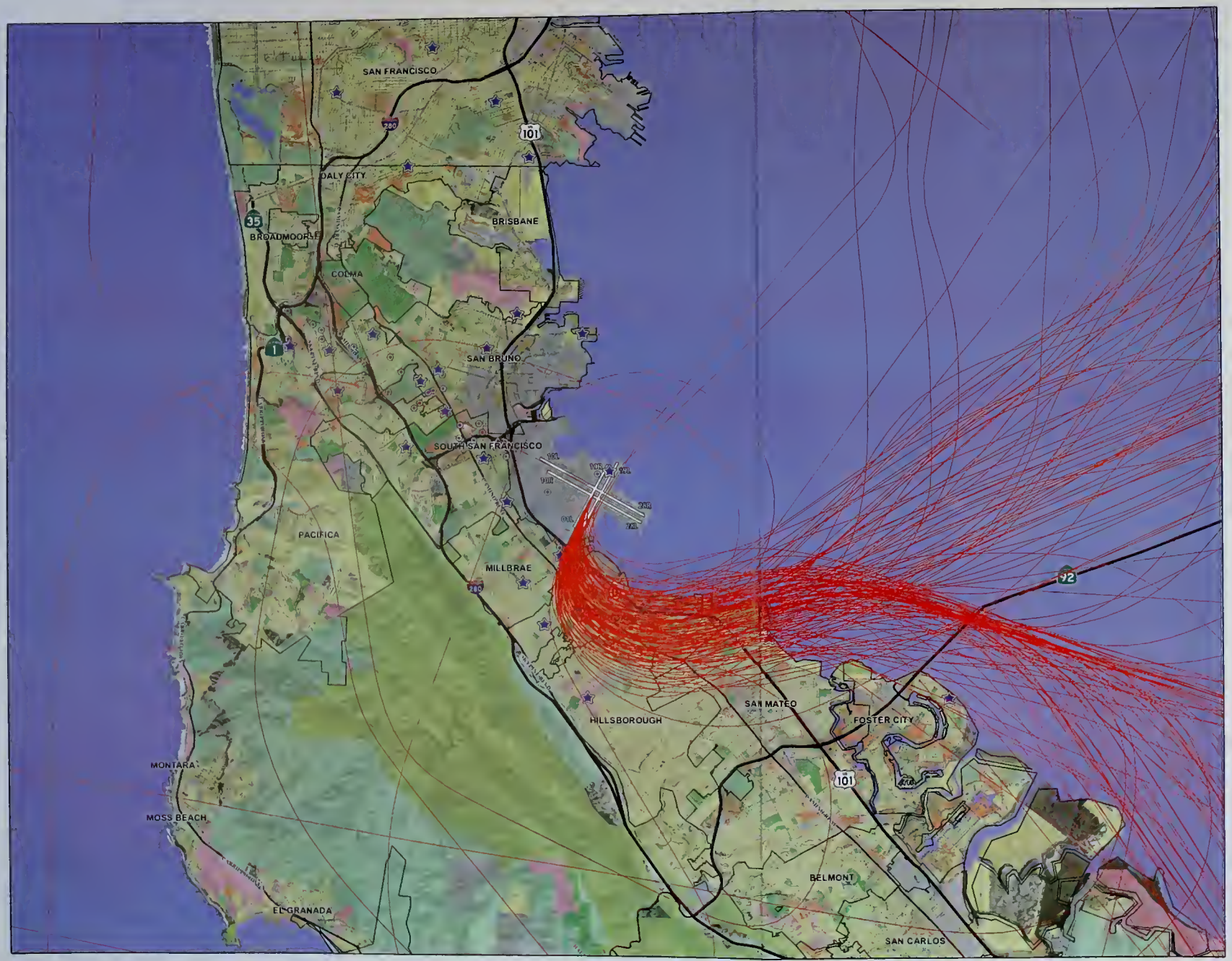

Figure A12
Departure Flight Tracks (Radar)
Runway 19 L/R

Land Use Legend

- Single-family Residential
- Multiple-family Residential
- Retail
- Industrial
- Public
- Agricultural
- Open Space
- Water
- Vacant
- Landmarks
- Noise Monitoring Sites

Radar Track

N

0 1 2 4 miles

SFO
San Francisco International Airport

Appendix C

Land Use Assurance Letter

San Francisco International Airport

March 1, 2011

Mr. John Louie
Environmental/NEPA Specialist
Federal Aviation Administration
ATO WSA Engineering Services
Anchorage Federal Office Building
222 W. 7th Ave #14
Anchorage, Alaska 99513

Subject: ***Proposed Relocation of the Airport Traffic Control Tower, San Francisco International Airport, CA, Land Use Assurance Letter***

Dear Mr. Louie:

The City and County of San Francisco, California makes the following statement of land use assurance as required by Section 511 (a)(5) of the Airport and Airway Improvement Act of 1982, as amended:

> *The City and County of San Francisco provides assurance, that appropriate action, within the authority of the City and County of San Francisco, including encouragement of the adoption of zoning laws, has been or will be taken, to the extent reasonable to restrict the use of land adjacent to or in the immediate vicinity of San Francisco International Airport to activities and purposes compatible with normal airport operations both existing and in the future. The City and County of San Francisco works with the adjacent municipalities having land use jurisdiction over land adjacent to or in the immediate vicinity of San Francisco International Airport, and encourages the adoption of zoning laws, to the extent reasonable, to restrict the use of land adjacent to or in the vicinity of the Airport to activities and purposes compatible with airport operations.*

San Francisco International Airport (SFO or the Airport) is physically located in the County of San Mateo, California. Directly to the north, west and south, SFO shares jurisdictional boundaries with the cities of South San Francisco, San Bruno, and Millbrae, respectively. Although SFO is located in unincorporated County of San Mateo, the City and County of San Francisco has land use authority over the Airport. SFO is not therefore, subject to the land use regulations of the County of San Mateo. SFO takes the opportunity to comment on adjacent community land use proposals and zoning changes that may affect the operations of the airport. While SFO works with these various outside agencies and municipalities, it does not have authority to impose such restrictions on the use of land adjacent to or in the vicinity of the Airport.

If you have any questions regarding this matter, please contact us at your earliest convenience.

Very truly yours,

John L. Martin
Airport Director

Appendix D

Air Quality

I. Introduction

This appendix summarizes the methods used to calculate emissions of carbon monoxide (CO), particulate matter less than ten microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), volatile organic compounds (VOCs), oxides of nitrogen (NO_x), and oxides of sulfur (SO_x) in support of the Environmental Assessment for relocation of the Airport Traffic Control Tower (ATCT) at San Francisco International Airport (Airport). The emissions analysis was conducted to determine whether emissions associated with construction and operation of the proposed ATCT would exceed applicable *de minimis* thresholds as documented in the U.S. Environmental Protection Agency's (U.S. EPA) general conformity regulations.

Construction of the proposed ATCT and base building is expected to begin in April 2012 and conclude in May 2014. Demolition of the existing ATCT is scheduled to begin in August 2015 and be completed by November 2015. Demolition of the office space below the ATCT is expected to be completed by the end of 2016. Therefore, pollutant emissions were estimated for the following construction years: 2012, 2013, 2014, 2015, and 2016.

II. Methodology

The Urban Emissions (URBEMIS) 2007 model (version 9.2.4) was used to estimate the construction emissions associated with the Proposed Action.[1] URBEMIS was originally developed by the California Air Resources Board (CARB) as a modeling tool to assist local public agencies with estimating air quality impacts from land use projects. The model estimates construction, area source, and operational emissions from a wide variety of land use development projects, such as residential neighborhoods, shopping centers, office buildings, etc. The model also identifies mitigation measures and associated emission reductions.

URBEMIS2007 calculates emissions for PM_{10}, $PM_{2.5}$, CO, reactive organic gases (ROG)[2], SO_x, NO_x, and carbon dioxide (CO_2) for both on-road and off-road construction sources. The model uses the CARB's EMFAC2007 model for on-road vehicle emissions and the CARB's OFFROAD2007 model for off-road vehicle emissions.

The EMFAC2007 model calculates emission rates from all motor vehicles, ranging from passenger cars to heavy-duty trucks, operating on highways, freeways, and local roads in California. In the URBEMIS2007 model, default or user-defined vehicle activity data is used to derive total vehicle miles traveled, which is multiplied by appropriate EMFAC2007 emission factors to calculate on-road emissions. EMFAC2007 emission factors are region/county specific. For purposes of this analysis, emission factors specific to San Mateo County (the location of the Proposed Action) were loaded into the URBEMIS2007 model. All emission factors account for emissions from start, running, and idling exhaust. In addition, ROG (VOC) emission factors include diurnal, hot soak, running, and resting emissions, and the PM_{10} and $PM_{2.5}$ emission factors include tire and brake wear.

To estimate off-road construction equipment-related exhaust emissions, URBEMIS2007 uses the OFFROAD2007 model to generate emission factors for construction equipment, which are based on an average fleet mix that accounts for the turnover rate and average emissions for specific types of construction equipment. Depending on the construction phase, URBEMIS2007 generates default

---

1 The Proposed Action includes construction of a new ATCT facility and associated base building, as well as demolition of the existing ATCT, including associated office and mechanical space.

2 For purposes of this analysis, it was assumed that estimates of VOC emissions are equal to calculated emissions of ROG.

values for number and types of construction equipment, horsepower, load factor, and daily operating hours. The model allows the user to override these values as appropriate. For each piece of equipment selected, URBEMIS2007 generates an emissions estimate using the following equation:

*Equipment Emissions (pounds/day) = # of pieces of equipment * grams per brake horsepower-hour * equipment horsepower * hours/day * load factor*

Information used in developing URBEMIS2007 inputs was obtained from various sources, including:

- San Francisco International Airport, Bureau of Design and Construction, *SFIA ATCT Preliminary Floor Plans and Sections*, March 2010.
- Federal Aviation Administration, Air Traffic Organization Terminal Services (ATO-T), *SFO Airport Traffic Control Tower (ATCT) Requirements Document*, February 3, 2010.
- *Draft SFO ATCT Schedule*, July 2, 2010.
- Federal Aviation Administration, Los Angeles Terminal Engineering Center, *San Francisco International Airport Airport Traffic Control Tower Site Survey Final Report*, October 2008.
- SAGE Environmental, L.L.C., *Final Environmental Assessment – Airport Traffic Control Tower (ATCT) and Base Building Construction and Operation, McCarran International Airport*, June 30, 2009.
- Conversations with and information received from San Francisco International Airport staff.

III. Construction Activity

URBEMIS2007 is capable of estimating emissions for several types of construction activities (phases) including demolition, grading, trenching, building construction, architectural coating, and paving. Each phase has one or more unique components, such as off-road fugitive dust, off-road construction exhaust, on-road vehicle exhaust, worker trips, vendor trips, and off-gassing. Emissions are estimated separately by phase and by phase component. Each component is assumed to generate emissions throughout the entire phase length. Assumptions concerning lengths of each applicable construction phase for purposes of this air quality analysis are shown in **Table 1**.

Table 1

Construction Phase Schedule

Construction Phase	Start	End	Duration	
			Calendar Days	Work Days [1/]
Grading	4/14/2012	4/21/2012	7	5
Trenching	4/22/2012	5/6/2012	14	10
Building construction	5/7/2012	5/7/2014	730	523
Architectural coating	4/7/2014	5/7/2014	30	23
Demolition	8/1/2015	10/28/2016	454	325

Note:
1/ Assumes 5 work days per week.

Sources: *Draft SFO ATCT Schedule*, July 2, 2010 and Ricondo & Associates, Inc., January 2011.
Prepared by: Ricondo & Associates, Inc., January 2011.

The following sections identify and describe the assumptions used for estimating emissions associated with each type of construction phase/activity assumed for this analysis.

3.1 Grading

The proposed ATCT and base building would be constructed at a site in Courtyard 2, an area between Terminals 1 and 2. Courtyard 2 is paved and currently serves as a parking area for San Francisco Police Department and other vehicles. According to floor plans developed for the proposed ATCT, the first level of the facility covers an area of approximately 6,900 square feet. Most of the first floor office area and the entire ATCT would be situated on approximately 5,000 square feet (0.11 acres) of Courtyard 2. For purposes of this analysis, it was assumed that the existing pavement in this area (0.11 acres) would be demolished and graded to support construction of the ATCT and base building foundations. It was assumed that the remainder of the proposed base building area would be integrated into the existing Terminal 2 structure, requiring no foundation work or associated grading activity.

In estimating grading emissions, URBEMIS2007 calculates emissions separately for each of the following components: fugitive dust, off-road construction equipment, on-road construction equipment, and construction worker commute trips.

- **Fugitive dust emissions** – For estimating fugitive dust (PM_{10}) emissions associated with grading activity, URBEMIS2007 uses a methodology developed for the South Coast Air Quality Management District (SCAQMD) by the Midwest Research Institute. The four-tiered methodology allows for more refined PM_{10} estimates based on the level of detail known for the construction project. For purposes of this analysis, the default (lowest) level of detail was used, which requires inputs of area to be graded and activity duration. Default emission factors are then applied: 20 pounds/acre-day under average conditions and 0.42 tons/acre-month under worst-case conditions.
- **Off-road construction equipment emissions** – On-site grading exhaust emissions are generated by the operation of off-road construction equipment, such as scrapers, bulldozers, and loaders. For this construction phase, default numbers, types, and operating specifications (load factor, horsepower, and daily operating hours) of construction equipment as suggested in URBEMIS2007 were assumed.
- **On-road construction equipment emissions** – For grading activity, on-road construction equipment emissions consist of truck trips to haul soil to or from the site for cut/fill operations. No importing or exporting of soil was assumed for this analysis. Therefore, no on-road grading-related construction equipment emissions were estimated.
- **Construction worker commute trips** – For grading, URBEMIS2007 estimates the number of workers as 125 percent of the total number of construction equipment (vehicles and machines) selected. The emissions estimates assume a construction worker commute fleet mix of 50 percent light duty autos and 50 percent light duty trucks. Default values for worker commute travel distance and speed were assumed.

3.2 Trenching

The proposed site for the new ATCT is approximately 430 feet south-southwest of the existing ATCT. It is anticipated that underground electrical service lines would be installed from the new ATCT and base building to existing lines located in Terminal 2. It is estimated that approximately 360 feet of trenching would be required to facilitate the electrical connections. Additional utilities, such as water and sewer services, were assumed to tie in with existing Terminal 1 and/or Terminal 2 services located adjacent to the proposed site. No significant trenching activity is assumed to be required for these connections.

In estimating trenching emissions, URBEMIS2007 calculates emissions separately for each of the following components: off-road construction equipment and construction worker commute trips.

- **Off-road construction equipment emissions** – On-site trenching exhaust emissions are generated by the operation of off-road construction equipment, such as excavators, and loaders. For this construction phase, default numbers, types, and operating specifications of construction equipment as suggested in URBEMIS2007 were assumed.
- **Construction worker commute trips** – For trenching, URBEMIS2007 estimates the number of workers as 125 percent of the total number of construction equipment (vehicles and machines) selected. The emissions estimates assume a construction worker commute fleet mix of 50 percent light duty autos and 50 percent light duty trucks. Default values for worker commute travel distance and speed were assumed.

3.3 Building Construction

The total area of the proposed ATCT and base building is estimated to be approximately 39,600 square feet. In estimating building construction emissions, URBEMIS2007 calculates emissions separately for each of the following components: off-road construction equipment, construction worker commute trips, and construction vendor trips.

- **Off-road construction equipment emissions** – Building construction emissions consist of emissions from construction equipment. The number and type of equipment can vary substantially, depending on the type of building and its location. URBEMIS2007 assigns default equipment numbers, types, and specifications depending on the size of the area upon which the building will be constructed. For this construction phase, default URBEMIS2007 equipment types and specifications were supplemented with additional equipment types and specifications assumed in the *Final Environmental Assessment – Airport Traffic Control Tower (ATCT) and Base Building Construction and Operation, McCarran International Airport*, completed by SAGE Environmental L.L.C. in June 30, 2009.
- **Construction worker commute trips** – URBEMIS2007 estimates construction-related employee trips based on the land use type selected for the project.[3] For purposes of this analysis, the "commercial" land use type was selected. For commercial land use projects, URBEMIS2007 assumes 0.32 vehicle trips per 1,000 square feet of building construction. This value is multiplied by the trip length to calculate daily VMT. URBEMIS2007 then uses the appropriate construction year and vehicle speed to select EMFAC2007 emission rates that will be multiplied by VMT/day. Default values for worker commute travel distance and speed were assumed.
- **Construction vendor trips** – Vendor trips represent the on-road trips needed to bring building supplies to the worksite. For commercial construction, URBEMIS2007 assumes construction-related vendor trips of 0.05 trips per 1,000 square feet of building construction. The model then multiplies this value by trip length to obtain daily VMT. The construction year in which the trips would occur and vehicle speed are used to select EMFAC2007 emission rates to be multiplied by VMT/day. Default values for worker commute travel distance and speed were assumed. Vendor trips are assumed to consist of 100 percent heavy-heavy-duty trucks.

[3] URBEMIS2007 land use categories include Residential, Educational, Recreational, Large Retail, Retail, Commercial, and Industrial.

3.4 Architectural Coating

URBEMIS2007 estimates ROG/VOC emissions resulting from the evaporation of solvents contained in paints, varnishes, primers, and other surface coatings. In estimating emissions from the application of architectural coatings, URBEMIS2007 calculates emissions separately for each of the following components: off-gas/evaporative emissions and construction worker commute trips.

- **Off-gas/evaporative emissions** – URBEMIS2007 uses separate procedures to estimate evaporative emissions from the application of residential and nonresidential architectural coatings. For each type of paint/coating, the appropriate air district-specific VOC content of the coating is converted to an emission factor in pounds of VOC per square feet of paint applied by assuming a coating average of 180 square feet per gallon. For nonresidential applications, the square feet to be painted is derived by multiplying the total building square footage by 2.0 to convert nonresidential building square footage to surface area to be coated. URBEMIS2007 assumes that 75 percent of total nonresidential coatings is interior and 25 percent is exterior.
- **Construction worker commute trips** – URBEMIS2007 assumes that worker commute trips associated with architectural coating are equal to 20 percent of worker commute trips for building construction. Therefore, architectural coating emissions from worker commute trips will equal approximately 20 percent of building construction worker commute trip emissions.

3.5 Demolition

The Proposed Action includes demolition of the existing ATCT and associated office/administrative areas. URBEMIS calculates emissions resulting from building demolition based on the volume of all buildings to be demolished. Based on area estimates and assuming 16 feet per floor level, the total volume of structures to be demolished is assumed to be approximately 590,400 cubic feet.

In estimating demolition emissions, URBEMIS2007 calculates emissions separately for each of the following components: fugitive dust, on-road construction equipment, off-road construction equipment, and construction worker commute trips.

- **Fugitive dust emissions** – Fugitive dust (PM_{10}) emissions are assumed to be generated as a result of demolition activities. URBEMIS2007 estimates PM_{10} generated by demolition by multiplying the volume of structures to be demolished (in cubic feet) by an emission factor of 0.00042 pounds of PM_{10} per cubic-foot.
- **On-road construction equipment emissions** – URBEMIS2007 estimates exhaust emissions from on-road vehicles used to haul demolished materials away from the job site. Based on the building volume to be demolished, the model generates default information regarding demolition hauling. All model defaults were used for purposes of this analysis. URBEMIS2007 assumes a hauling round trip of 20 miles and a truck capacity of 20 cubic yards. The number of round trips and the VMT traveled are based on the volume of material to be demolished (reduced by 75 percent to account for air space), the truck capacity, and miles per round trip. Emissions estimated by multiplying VMT by an appropriate EMFAC2007 emission factor for heavy-heavy-duty trucks traveling at a default average speed.
- **Off-road construction equipment emissions** – Exhaust emissions from demolition activities are generated by the operation of off-road construction equipment, such as cranes, bulldozers, and loaders. For this construction phase, default numbers, types, and operating specifications of construction equipment as suggested in URBEMIS2007 were assumed.

- **Construction worker commute trips** – For demolition, URBEMIS2007 estimates the number of workers as 125 percent of the total number of construction equipment (vehicles and machines) selected. The emissions estimates assume a construction worker commute fleet mix of 50 percent light duty autos and 50 percent light duty trucks. Default values for worker commute travel distance and speed were assumed.

IV. Mitigation

URBEMIS2007 allows for the application of several mitigation measures to reduce emissions associated with fugitive dust, construction equipment exhaust emissions, and emissions associated with architectural coating. The following bullet points describe the mitigation measures that were assumed by construction phase for purposes of this air quality analysis. URBEMIS2007 default values were assumed for the specific emissions reductions of various pollutants correlating with the mitigation measures.

- **Grading** – To mitigate fugitive dust emissions related to soil disturbance, it was assumed that any exposed surfaces would be watered two times per day (reduces PM_{10} and $PM_{2.5}$ emissions by 55 percent). To mitigate exhaust emissions, the use of diesel particulate filters was assumed for all off-road construction equipment (reduces PM_{10} and $PM_{2.5}$ emissions by 85 percent).
- **Trenching** – To mitigate exhaust emissions, the use of diesel particulate filters was assumed for all off-road construction equipment (reduces PM_{10} and $PM_{2.5}$ emissions by 85 percent).
- **Building construction** – To mitigate exhaust emissions, the use of diesel particulate filters was assumed for all off-road construction equipment (reduces PM_{10} and $PM_{2.5}$ emissions by 85 percent).
- **Architectural coating** – To reduce off-gas/evaporative emissions related to coating/painting, the use of low-VOC coatings was assumed (reduces ROG/VOC emissions by 10 percent).
- **Demolition** – To mitigate exhaust emissions, the use of diesel particulate filters was assumed for all off-road construction equipment (reduces PM_{10} and $PM_{2.5}$ emissions by 85 percent).

V. Summary of Construction Emissions

A summary of total unmitigated and mitigated construction-related emissions by construction year and phase for the Proposed Action is presented in **Table 2** and **Table 3**, respectively.

Table 2

Unmitigated Construction Emissions Summary – Proposed Action

Year/Construction Phase [1/]	Pollutant Emissions (tons/year)					
	Carbon Monoxide (CO)	Volatile Organic Compound (VOC) [2/]	Oxides of Nitrogen (NO_X)	Oxides of Sulfur (SO_X)	Particulate matter (PM_{10})	Fine particulate matter ($PM_{2.5}$)
2012						
Grading	0.031	0.007	0.055	0.000	0.004	0.003
Trenching	0.045	0.009	0.076	0.000	0.004	0.003
Building construction	1.407	0.319	2.393	0.000	0.142	0.130
Total [3/]	1.483	0.335	2.524	0.000	0.150	0.136
2013						
Building construction	2.102	0.453	3.357	0.000	0.194	0.178
Total [3/]	2.102	0.453	3.357	0.000	0.194	0.178
2014						
Building construction	0.717	0.147	0.146	0.000	0.060	0.055
Architectural coating	0.004	0.424	0.000	0.000	0.000	0.000
Total [3/]	0.721	0.571	1.046	0.000	0.060	0.055
2015						
Demolition	0.406	0.079	0.596	0.000	0.072	0.037
Total [3/]	0.406	0.079	0.596	0.000	0.072	0.037
2016						
Demolition	0.780	0.146	1.086	0.000	0.135	0.065
Total [3/]	0.780	0.146	1.086	0.000	0.135	0.065

Notes:

1/ Grading emissions include fugitive dust emissions, off-road construction equipment emissions, on-road construction equipment emissions, and emissions from construction worker commute trips.
Trenching emissions include off-road construction equipment emissions and emissions from construction worker commute trips.
Building construction emissions include off-road construction equipment emissions, emissions from construction worker commute trips, and emissions from construction vendor trips.
Architectural coating emissions include off-gas/evaporative emissions and emissions from construction worker commute trips.
Demolition emissions include fugitive dust emissions, on-road construction equipment emissions, off-road construction equipment emissions, and emissions from construction worker commute trips.

2/ The URBEMIS2007 model estimates reactive organic gases (ROG). For purposes of this analysis, it was assumed that estimates of VOC emissions are equal to calculated emissions of ROG.

3/ Columns may not add to totals shown because of rounding.

Sources: Ricondo & Associates, Inc., January 2011, based on the URBEMIS2007 emissions model (version 9.2.4) and information obtained from San Francisco International Airport.
Prepared by: Ricondo & Associates, Inc., January 2011.

Table 3

Mitigated Construction Emissions Summary – Proposed Action

Year/Construction Phase [1/]	Pollutant Emissions (tons/year)					
	Carbon Monoxide (CO)	Volatile Organic Compound (VOC) [2/]	Oxides of Nitrogen (NO_X)	Oxides of Sulfur (SO_X)	Particulate matter (PM_{10})	Fine particulate matter ($PM_{2.5}$)
2012						
Grading	0.031	0.007	0.055	0.000	0.001	0.001
Trenching	0.045	0.009	0.076	0.000	0.001	0.001
Building construction	1.407	0.319	2.393	0.000	0.023	0.021
Total [3/]	1.483	0.335	2.524	0.000	0.025	0.022
2013						
Building construction	2.102	0.453	3.357	0.000	0.032	0.029
Total [3/]	2.102	0.453	3.357	0.000	0.032	0.029
2014						
Building construction	0.717	0.147	0.146	0.000	0.010	0.009
Architectural coating	0.004	0.382	0.000	0.000	0.000	0.000
Total [3/]	0.721	0.529	1.046	0.000	0.010	0.009
2015						
Demolition	0.406	0.079	0.596	0.000	0.047	0.014
Total [3/]	0.406	0.079	0.596	0.000	0.047	0.014
2016						
Demolition	0.780	0.146	1.086	0.000	0.092	0.026
Total [3/]	0.780	0.146	1.086	0.000	0.092	0.026

Notes:

1/ Grading emissions include fugitive dust emissions, off-road construction equipment emissions, on-road construction equipment emissions, and emissions from construction worker commute trips.
Trenching emissions include off-road construction equipment emissions and emissions from construction worker commute trips.
Building construction emissions include off-road construction equipment emissions, emissions from construction worker commute trips, and emissions from construction vendor trips.
Architectural coating emissions include off-gas/evaporative emissions and emissions from construction worker commute trips.
Demolition emissions include fugitive dust emissions, on-road construction equipment emissions, off-road construction equipment emissions, and emissions from construction worker commute trips.

2/ The URBEMIS2007 model estimates reactive organic gases (ROG). For purposes of this analysis, it was assumed that estimates of VOC emissions are equal to calculated emissions of ROG.

3/ Columns may not add to totals shown because of rounding.

Sources: Ricondo & Associates, Inc., January 2011, based on the URBEMIS2007 emissions model (version 9.2.4) and information obtained from San Francisco International Airport.
Prepared by: Ricondo & Associates, Inc., January 2011.

VI. URBEMIS2007 Data

URBEMIS2007 creates a report presenting summary and detail emissions tables, as well as various model inputs/assumptions. This report is provided in the following pages.

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Ricondo Projects\Active Projects\San Francisco\ATCT - EA\SFO ATCT ConstructionEmissions.urb924

Project Name: San Francisco International Airport ATCT Relocation

Project Location: San Mateo County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5	PM2.5	CO2
2012 TOTALS (tons/year unmitigated)	0.335	2.524	1.483	0.000	0.003	0.147	0.150	0.001	0.135	0.136	370.126
2012 TOTALS (tons/year mitigated)	0.335	2.524	1.483	0.000	0.002	0.023	0.025	0.001	0.021	0.022	370.126
Percent Reduction	0.000	0.000	0.000	0.000	23.093	84.230	83.077	17.314	84.267	83.879	0.000
2013 TOTALS (tons/year unmitigated)	0.453	3.357	2.102	0.000	0.002	0.192	0.194	0.001	0.177	0.178	542.113
2013 TOTALS (tons/year mitigated)	0.453	3.357	2.102	0.000	0.002	0.030	0.032	0.001	0.028	0.029	542.113
Percent Reduction	0.000	0.000	0.000	0.000	0.000	84.168	83.319	0.000	84.210	83.877	0.000
2014 TOTALS (tons/year unmitigated)	0.571	1.046	0.721	0.000	0.001	0.059	0.060	0.000	0.055	0.055	189.522
2014 TOTALS (tons/year mitigated)	0.529	1.046	0.721	0.000	0.001	0.009	0.010	0.000	0.009	0.009	189.522
Percent Reduction	7.425	0.000	0.000	0.000	0.000	84.094	83.104	0.000	84.143	83.755	0.000
2015 TOTALS (tons/year unmitigated)	0.079	0.596	0.406	0.000	0.042	0.031	0.072	0.009	0.028	0.037	93.588
2015 TOTALS (tons/year mitigated)	0.079	0.596	0.406	0.000	0.042	0.005	0.047	0.009	0.005	0.014	93.588
Percent Reduction	0.000	0.000	0.000	0.000	0.000	82.412	34.677	0.000	82.471	62.740	0.000
2016 TOTALS (tons/year unmitigated)	0.146	1.086	0.780	0.000	0.083	0.052	0.135	0.017	0.048	0.065	185.461
2016 TOTALS (tons/year mitigated)	0.146	1.086	0.780	0.000	0.083	0.009	0.092	0.017	0.008	0.026	185.461
Percent Reduction	0.000	0.000	0.000	0.000	0.000	82.252	31.608	0.000	82.320	60.259	0.000

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012	0.335	2.524	1.483	0.000	0.003	0.147	0.150	0.001	0.135	0.136	370.126
Fine Grading 04/14/2012-04/21/2012	0.007	0.055	0.031	0.000	0.002	0.003	0.004	0.000	0.002	0.003	5.873
Fine Grading Dust	0.000	0.000	0.000	0.000	0.002	0.000	0.002	0.000	0.000	0.000	0.000
Fine Grading Off Road Diesel	0.007	0.055	0.029	0.000	0.000	0.003	0.003	0.000	0.002	0.002	5.618
Fine Grading On Road Diesel	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fine Grading Worker Trips	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.255
Trenching 04/22/2012-05/06/2012	0.009	0.076	0.045	0.000	0.000	0.004	0.004	0.000	0.003	0.003	9.083
Trenching Off Road Diesel	0.009	0.076	0.040	0.000	0.000	0.004	0.004	0.000	0.003	0.003	8.573
Trenching Worker Trips	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.510
Building 05/07/2012-05/07/2014	0.319	2.393	1.407	0.000	0.001	0.141	0.142	0.000	0.129	0.130	355.170
Building Off Road Diesel	0.312	2.361	1.195	0.000	0.000	0.139	0.139	0.000	0.128	0.128	327.590
Building Vendor Trips	0.002	0.021	0.017	0.000	0.000	0.001	0.001	0.000	0.001	0.001	5.470
Building Worker Trips	0.006	0.011	0.196	0.000	0.001	0.001	0.002	0.000	0.000	0.001	22.109
2013	0.453	3.357	2.102	0.000	0.002	0.192	0.194	0.001	0.177	0.178	542.113
Building 05/07/2012-05/07/2014	0.453	3.357	2.102	0.000	0.002	0.192	0.194	0.001	0.177	0.178	542.113
Building Off Road Diesel	0.442	3.314	1.802	0.000	0.000	0.191	0.191	0.000	0.175	0.175	500.006
Building Vendor Trips	0.002	0.028	0.024	0.000	0.000	0.001	0.001	0.000	0.001	0.001	8.348
Building Worker Trips	0.008	0.015	0.276	0.000	0.002	0.001	0.002	0.001	0.001	0.001	33.758
2014	0.571	1.046	0.721	0.000	0.001	0.059	0.060	0.000	0.055	0.055	189.522
Building 05/07/2012-05/07/2014	0.147	1.046	0.717	0.000	0.001	0.059	0.060	0.000	0.055	0.055	189.016
Building Off Road Diesel	0.144	1.032	0.620	0.000	0.000	0.059	0.059	0.000	0.054	0.054	174.332
Building Vendor Trips	0.001	0.009	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.910
Building Worker Trips	0.003	0.005	0.089	0.000	0.001	0.000	0.001	0.000	0.000	0.000	11.774
Coating 04/07/2014-05/07/2014	0.424	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.505
Architectural Coating	0.424	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Coating Worker Trips	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.505
2015	0.079	0.596	0.406	0.000	0.042	0.031	0.072	0.009	0.028	0.037	93.588
Demolition 08/01/2015-10/28/2016	0.079	0.596	0.406	0.000	0.042	0.031	0.072	0.009	0.028	0.037	93.588
Fugitive Dust	0.000	0.000	0.000	0.000	0.281	0.000	0.281	0.058	0.000	0.058	0.000
Demo Off Road Diesel	0.076	0.572	0.341	0.000	0.000	0.030	0.030	0.000	0.027	0.027	79.729
Demo On Road Diesel	0.002	0.021	0.007	0.000	0.000	0.001	0.001	0.000	0.001	0.001	5.510
Demo Worker Trips	0.002	0.003	0.059	0.000	0.000	0.000	0.001	0.000	0.000	0.000	8.349
2016	0.146	1.086	0.780	0.000	0.083	0.052	0.135	0.017	0.048	0.065	185.461
Demolition 08/01/2015-10/28/2016	0.146	1.086	0.780	0.000	0.083	0.052	0.135	0.017	0.048	0.065	185.461
Fugitive Dust	0.000	0.000	0.000	0.000	0.557	0.000	0.557	0.116	0.000	0.116	0.000
Demo Off Road Diesel	0.141	1.044	0.659	0.000	0.000	0.050	0.050	0.000	0.046	0.046	157.995
Demo On Road Diesel	0.003	0.036	0.013	0.000	0.000	0.001	0.002	0.000	0.001	0.001	10.919
Demo Worker Trips	0.003	0.006	0.108	0.000	0.001	0.000	0.001	0.000	0.000	0.001	16.547

Phase Assumptions

Phase: Demolition 8/1/2015 - 10/28/2016 - Demolition of existing ATCT and associated office space
Building Volume Total (cubic feet): 590400
Building Volume Daily (cubic feet): 1808
On Road Truck Travel (VMT): 25.11
Off-Road Equipment:
1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day
1 Cranes (399 hp) operating at a 0.43 load factor for 8 hours per day
1 Dumpers/Tenders (16 hp) operating at a 0.38 load factor for 8 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day
2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Fine Grading 4/14/2012 - 4/21/2012 - Grading 5,000 s.f. of Courtyard 2 for building foundation
Total Acres Disturbed: 0.11
Maximum Daily Acreage Disturbed: 0.03
Fugitive Dust Level of Detail: Default
20 lbs per acre-day
On Road Truck Travel (VMT): 0
Off-Road Equipment:
1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 4/22/2012 - 5/6/2012 - Trenching 360 ft. for electrical tie-in to Terminal 2
Off-Road Equipment:
2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day
1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Building Construction 5/7/2012 - 5/7/2014 - Construction of ATCT and associated office space
Off-Road Equipment:
3 Air Compressors (106 hp) operating at a 0.48 load factor for 8 hours per day
1 Bore/Drill Rigs (291 hp) operating at a 0.75 load factor for 8 hours per day
1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day
1 Dumpers/Tenders (16 hp) operating at a 0.38 load factor for 8 hours per day
2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Architectural Coating 4/7/2014 - 5/7/2014 - Painting/coating of ATCT and associated office space
Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012	0.335	2.524	1.483	0.000	0.002	0.023	0.025	0.001	0.021	0.022	370.126
Fine Grading 04/14/2012-04/21/2012	0.007	0.055	0.031	0.000	0.001	0.000	0.001	0.000	0.000	0.001	5.873
Fine Grading Dust	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000
Fine Grading Off Road Diesel	0.007	0.055	0.029	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.618
Fine Grading On Road Diesel	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fine Grading Worker Trips	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.255
Trenching 04/22/2012-05/06/2012	0.009	0.076	0.045	0.000	0.000	0.001	0.001	0.000	0.001	0.001	9.083
Trenching Off Road Diesel	0.009	0.076	0.040	0.000	0.000	0.001	0.001	0.000	0.001	0.001	8.573
Trenching Worker Trips	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.510
Building 05/07/2012-05/07/2014	0.319	2.393	1.407	0.000	0.001	0.022	0.023	0.000	0.020	0.021	355.170
Building Off Road Diesel	0.312	2.361	1.195	0.000	0.000	0.021	0.021	0.000	0.019	0.019	327.590
Building Vendor Trips	0.002	0.021	0.017	0.000	0.000	0.001	0.001	0.000	0.001	0.001	5.470
Building Worker Trips	0.006	0.011	0.196	0.000	0.001	0.001	0.002	0.000	0.000	0.001	22.109
2013	0.453	3.357	2.102	0.000	0.002	0.030	0.032	0.001	0.028	0.029	542.113
Building 05/07/2012-05/07/2014	0.453	3.357	2.102	0.000	0.002	0.030	0.032	0.001	0.028	0.029	542.113
Building Off Road Diesel	0.442	3.314	1.802	0.000	0.000	0.029	0.029	0.000	0.026	0.026	500.006
Building Vendor Trips	0.002	0.028	0.024	0.000	0.000	0.001	0.001	0.000	0.001	0.001	8.348
Building Worker Trips	0.008	0.015	0.276	0.000	0.002	0.001	0.002	0.001	0.001	0.001	33.758
2014	0.529	1.046	0.721	0.000	0.001	0.009	0.010	0.000	0.009	0.009	189.522
Building 05/07/2012-05/07/2014	0.147	1.046	0.717	0.000	0.001	0.009	0.010	0.000	0.009	0.009	189.016
Building Off Road Diesel	0.144	1.032	0.620	0.000	0.000	0.009	0.009	0.000	0.008	0.008	174.332
Building Vendor Trips	0.001	0.009	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.910
Building Worker Trips	0.003	0.005	0.089	0.000	0.001	0.000	0.001	0.000	0.000	0.000	11.774
Coating 04/07/2014-05/07/2014	0.382	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.505
Architectural Coating	0.382	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Coating Worker Trips	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.505
2015	0.079	0.596	0.406	0.000	0.042	0.005	0.047	0.009	0.005	0.014	93.588
Demolition 08/01/2015-10/28/2016	0.079	0.596	0.406	0.000	0.042	0.005	0.047	0.009	0.005	0.014	93.588
Fugitive Dust	0.000	0.000	0.000	0.000	0.281	0.000	0.281	0.058	0.000	0.058	0.000
Demo Off Road Diesel	0.076	0.572	0.341	0.000	0.000	0.004	0.004	0.000	0.004	0.004	79.729
Demo On Road Diesel	0.002	0.021	0.007	0.000	0.000	0.001	0.001	0.000	0.001	0.001	5.510
Demo Worker Trips	0.002	0.003	0.059	0.000	0.000	0.000	0.001	0.000	0.000	0.000	8.349
2016	0.146	1.086	0.780	0.000	0.083	0.009	0.092	0.017	0.008	0.026	185.461
Demolition 08/01/2015-10/28/2016	0.146	1.086	0.780	0.000	0.083	0.009	0.092	0.017	0.008	0.026	185.461
Fugitive Dust	0.000	0.000	0.000	0.000	0.557	0.000	0.557	0.116	0.000	0.116	0.000
Demo Off Road Diesel	0.141	1.044	0.659	0.000	0.000	0.008	0.008	0.000	0.007	0.007	157.995
Demo On Road Diesel	0.003	0.036	0.013	0.000	0.000	0.001	0.002	0.000	0.001	0.001	10.919
Demo Worker Trips	0.003	0.006	0.108	0.000	0.001	0.000	0.001	0.000	0.000	0.001	16.547

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Demolition 8/1/2015 - 10/28/2016 - Demolition of existing ATCT and associated office space

For Concrete/Industrial Saws, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%

For Rubber Tired Dozers, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%

For Tractors/Loaders/Backhoes, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%

For Cranes, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%

For Dumpers/Tenders, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%

The following mitigation measures apply to Phase: Fine Grading 4/14/2012 - 4/21/2012 - Grading 5,000 s.f. of Courtyard 2 for building foundation

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:
PM10: 55% PM25: 55%

For Graders, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%

For Rubber Tired Dozers, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%

For Tractors/Loaders/Backhoes, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%

For Water Trucks, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%

The following mitigation measures apply to Phase: Trenching 4/22/2012 - 5/6/2012 - Trenching 360 ft. for electrical tie-in to Terminal 2

For Excavators, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%

For Other General Industrial Equipment, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%

For Tractors/Loaders/Backhoes, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%

The following mitigation measures apply to Phase: Building Construction 5/7/2012 - 5/7/2014 - Construction of ATCT and associated office space

For Cranes, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%

For Forklifts, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%

For Tractors/Loaders/Backhoes, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%

For Air Compressors, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%

For Bore/Drill Rigs, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%

For Dumpers/Tenders, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%

For Water Trucks, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%

The following mitigation measures apply to Phase: Architectural Coating 4/7/2014 - 5/7/2014 - Painting/coating of ATCT and associated office space

For Nonresidential Architectural Coating Measures, the Nonresidential Exterior: Use Low VOC Coatings mitigation reduces emissions by:
ROG: 10%

For Nonresidential Architectural Coating Measures, the Nonresidential Interior: Use Low VOC Coatings mitigation reduces emissions by:
ROG: 10%

Appendix E

Agency Correspondence

Project introduction letters were sent to 44 individuals representing federal, State, and local agencies with jurisdiction over resources either known to be in the vicinity of the Airport or for resources that could potentially be present in the area. Letters were also sent to surrounding communities. The purpose of the letters was to inform agencies and communities about the Environmental Assessment (EA) process, the proposed project, preliminary purpose and need, and preliminary alternatives and to solicit input on issues of concern that they would like addressed in the EA.

A sample letter (the same letter was sent to all 44 individuals/entities) is on the following pages; the list of individuals, agencies, and communities the letter was sent to, follows the sample letter.

RICONDO
& ASSOCIATES

December 22, 2010

Mr. Kenneth Kirkey
Planning Director
Association of Bay Area Governments
P.O. Box 2050
Oakland, CA 94604

RE: Environmental Assessment for Relocation of the Airport Traffic Control Tower
San Francisco International Airport

Dear Mr. Kirkey:

The City and County of San Francisco initiated on behalf of the Federal Aviation Administration (FAA) the preparation of an Environmental Assessment (EA) for the relocation of the existing Airport Traffic Control Tower (ATCT or the tower) at San Francisco International Airport (SFO or the Airport). Airport traffic control towers are located at airports with regularly scheduled flights.[1] FAA air traffic controllers working in the ATCTs manage aircraft takeoffs and landings to and from an airport as well as the ground movement of aircraft on an airfield. ATCT air traffic controllers are responsible for expediting the flow of aircraft traffic both in the air and on the ground and for managing aircraft to maintain safe separations between aircraft as well as between aircraft and other obstacles to prevent collisions. To facilitate management of the safe operation of aircraft, ATCTs are designed to provide air traffic controllers a vantage point from which they have an unobstructed view of aircraft on the ground within the areas of air traffic control (referred to as "movement areas") and in the air in the vicinity of the airport. It is critical that air traffic controllers have unobstructed visual sight lines to all areas of the airport's runways and taxiways.

ATCT facilities typically include (1) a base building which provides an elevator lobby/stair vestibule to access the tower cab and administrative offices; (2) a tower shaft for which the primary functional purpose is to accommodate elevator shafts, stairwells, and electrical/mechanical/plumbing conveyances; and (3) a tower cab positioned at an appropriate height to provide air traffic controllers unobstructed views of the airfield and surrounding airspace. Design considerations, such as the height of the tower cab and the number of air traffic controller positions to be accommodated in the tower cab are based on the level of aircraft activity to be managed at the airport, the airport size (area), and the airfield and airspace configuration.[2]

The existing ATCT building is owned and maintained by the City and County of San Francisco and leased at no cost to the FAA. The lease is automatically renewed each year barring written notice from the FAA that it will not exercise its option. The current lease stipulates that no renewal shall

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1 A regularly scheduled flight, or an operation, is an aircraft landing or take off.

2 U.S. Department of Transportation, Federal Aviation Administration, Air Traffic Organization, *Terminal Facilities Standard Designs A/E Project Manual*, July 27, 2009, Pages 94-95.

20 NORTH CLARK STREET, SUITE 1500, CHICAGO, IL 60602
TEL (312) 606-0611 • FAX (312) 606 0706

extend the period of occupancy beyond September 30, 2013. The existing tower is 195 feet tall and the tower cab has approximately 525 square feet of work area for air traffic controllers. The base building, tower shaft, and tower cab of the SFO ATCT facilities are structurally integrated with Terminal 2. In 2010, the tower accommodated 13 air traffic controller positions, with no room to add additional positions if higher levels of aircraft activity occur at SFO.

Terminal 2 was built in 1954 and included an ATCT, also constructed in the 1950s, on level 8 of the terminal. In 1981, Terminal 2 was renovated and converted to an international terminal. During the renovation, space was reserved for the construction of a new ATCT. Following the major terminal renovation, a new ATCT was constructed. The renovated Terminal 2 and new tower were constructed around the original 1950's tower, integrating the old tower into the updated facilities. The 1950's tower is currently used as a ramp tower by United Airlines staff to manage the ground flow of aircraft in one of the aircraft gate areas, an area not controlled by FAA air traffic controllers.

The existing ATCT was commissioned in 1984, and has surpassed the 20-year life span for which it was designed. In 2000, SFO opened a new international terminal and closed Terminal 2 for renovations; however, the tower remains operational and is accessed through the terminal building. Renovation of Terminal 2 to convert it from an international aircraft terminal to a domestic terminal began in May 2008, and is expected to be completed by April 2011. The Terminal 2/Boarding Area D renovation project received a Finding of No Significant Impact (FONSI) and Record of Decision (ROD) as part of the Master Plan Improvements Environmental Assessment on November 5, 1998.

In 2006, while preparing to initiate the Terminal 2 renovation project, a seismic evaluation was conducted of the entire Terminal 2 building and the ATCT facilities, which are structurally integrated. The evaluation led to the determination that extensive upgrades were required for the building and ATCT facilities to meet current seismic, building, and fire code standards and that damage from a major earthquake could render the ATCT inoperable. It was further determined that while it would be possible to seismically upgrade the terminal building during the renovation project, there were no viable seismic retrofit options for the ATCT facilities. Any significant upgrades to the tower would be cost prohibitive and would be functionally impractical since the ATCT could not remain fully operational during the period of seismic retrofit and structural strengthening activities.[3]

Purpose and Need for Project

A major earthquake could render the ATCT facilities at SFO inoperable, thus disrupting air traffic control operations at the Airport. To ensure that air traffic control operations at SFO are not disrupted by a seismic event, the City and County of San Francisco has identified the need to provide

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[3] Federal Aviation Administration, Los Angeles Terminal Engineering Center, *San Francisco International Airport, San Francisco, California, Airport Traffic Control Tower Site Survey Final Report*, October 2008.

ATCT facilities that meet current seismic code standards. Furthermore, the City and County of San Francisco has identified the need to be able to support future equipment installations, support modernized equipment, meet building and fire code standards, and provide space for additional air traffic controller positions as needed in the future to support forecasted growth of aircraft operations.

To address the needs identified above, the City and County of San Francisco has identified the purpose of the Proposed Action (or the solution to the need) as the provision of ATCT facilities at SFO that:

- Meet seismic, building, and fire code standards;
- Accommodate future equipment installations; and
- Support modernization of ATCT equipment.

While meeting the purpose, alternatives considered for the Proposed Action should also maximize safety of air traffic operations and operational efficiency and minimize disruption to existing facilities and ongoing terminal redevelopment work.

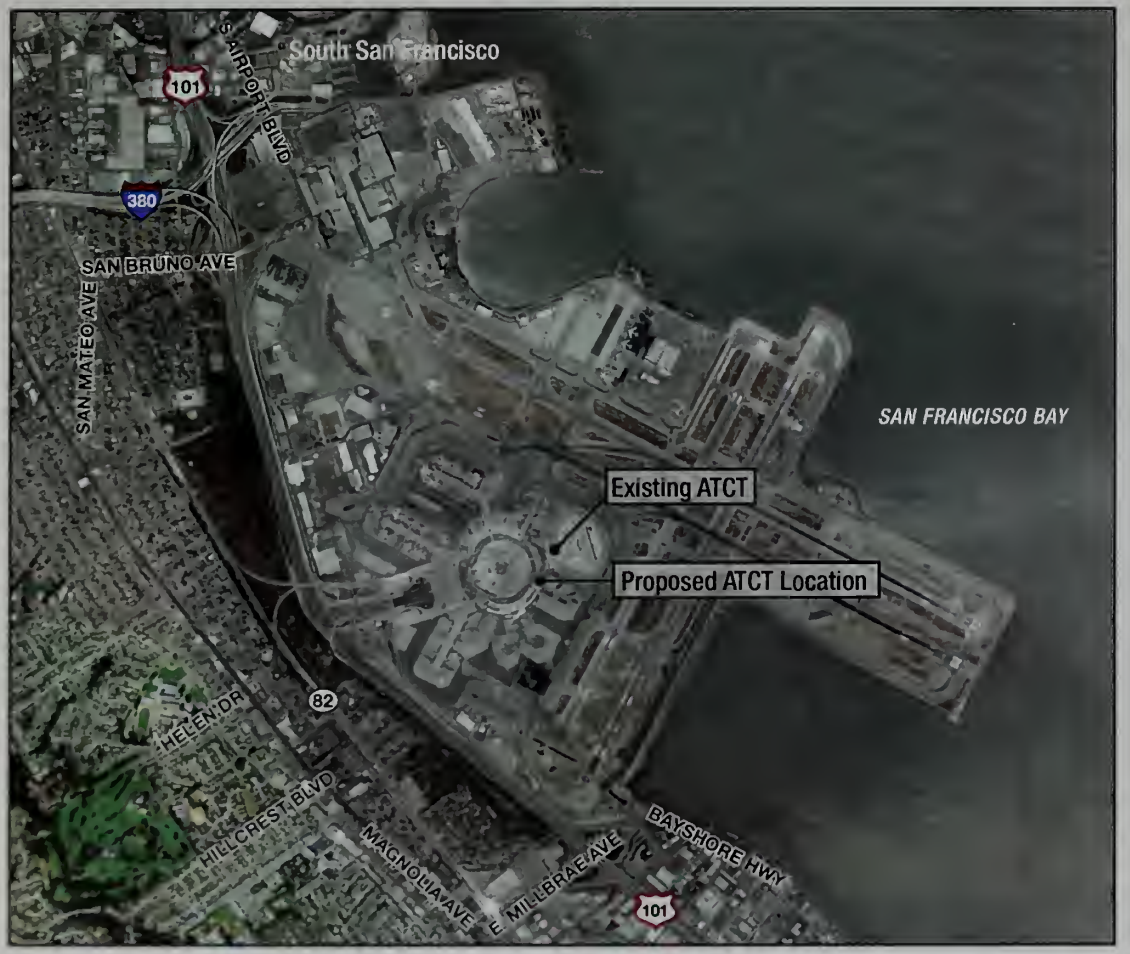
Alternatives

The FAA, in cooperation with the City and County of San Francisco, completed a study in October 2008 that evaluated 21 potential relocation sites and recommended a site in the courtyard between Terminals 1 and 2 (referred to as Courtyard 2) as the optimal site for a relocated ATCT within the Airport's Terminal Complex. The general project location is shown in **Exhibit 1**, and a view of the Terminal Complex in **Exhibit 2** illustrates the existing and proposed sites for the ATCT.

Proposed Action

The FAA ATCT functions, including the 195-foot tower and 525-square foot tower cab, currently located in Terminal 2 would be relocated to a proposed ATCT site in Courtyard 2, the area between Terminals 1 and 2. Specifically, the Proposed Action includes:

- **Relocation of the FAA ATCT.** The FAA ATCT functions currently located in ATCT facilities integrated with Terminal 2 would be relocated to a proposed new ATCT that would be constructed at a site in Courtyard 2, the area between Terminals 1 and 2. The replacement tower would be 228-feet tall, the tower shaft would be 40-feet in diameter and topped by a 650-square foot tower cab. A three-story base building would provide space for FAA office and other administrative activities. The departure level (level 2) would be shared by the FAA and SFO for concessions and restrooms as well as for pre- and post- security access corridors between Terminals 1 and 2. In total, the FAA functions in the existing ATCT account for 30,900 square feet and would be relocated into 39,600 square feet in the Courtyard 2 location—representing an increase of 8,700 square feet in ATCT space.



Note ATCT = Airport Traffic Control Tower

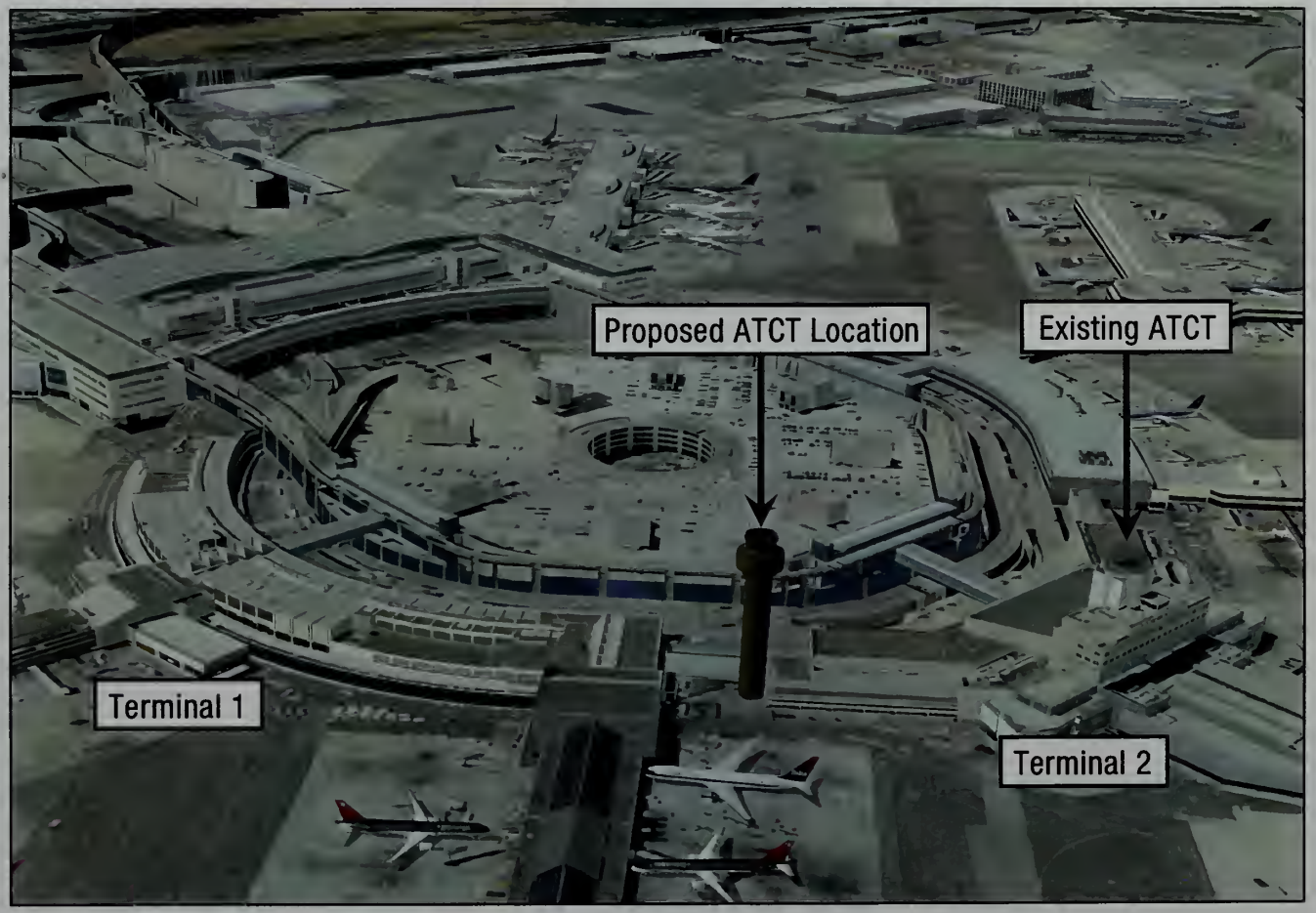
Sources Google Map Pro December 2010; Map Resources 2009.
Prepared by Ricondo & Associates, Inc , December 2010

Exhibit 1

Not to Scale

north

Project Location Map



Note: ATCT = Airport Traffic Control Tower

Source: Anna Fantoni, Bureau of Planning and Environmental Affairs, San Francisco International Airport, Presentation at the ACI-NA Operations and Technical Affairs Conference, San Diego, California, "Domestic Terminal Redevelopment Plan, Airport Planning and Development Case Studies," March 18, 2009.
Prepared by: Ricondo & Associates, Inc., December 2010.

Exhibit 2

Not to Scale

Terminal Complex

- **Demolition of the existing Terminal 2 office space and the FAA ATCT Facilities and associated office and mechanical space.** For seismic safety and line of sight reasons, the City and County of San Francisco would demolish the existing ATCT facilities and the Airport Administrative office space located on levels 6 through 10 of Terminal 2 when the relocated ATCT is commissioned and operational.

EA Process and Schedule

The City and County of San Francisco are in the process of developing the EA, and plan to release the draft EA for public and agency review in April 2011. The EA will document the project's purpose and need, the proposed action and alternatives to the proposed action, the affected environment, and environmental consequences. If you or someone in your organization has any specific concerns with the project, or recommend that a particular issue(s) should be addressed in the EA, we would appreciate a phone call, email, or in-person meeting by January 14, 2011 to discuss your concerns. Please address all comments to:

Audrey Park
Bureau of Planning and Environmental Affairs
San Francisco International Airport
P.O. Box 8097
San Francisco, California 94128
Tel: (650) 821-7844
Fax: (650) 821-5833
audrey.park@flysfo.com

Sincerely,
RICONDO & ASSOCIATES, INC.

Stephen Culberson
Director

cc: 10-0106-92-02
Read File

Kenneth Kirkey
Planning Director
Association of Bay Area Governments
P.O. Box 2050
Oakland, CA 94604

Richard Napier
Executive Director
City/County Association of Governments of San Mateo County
San Mateo County Office Building, 555 County Center, Fifth Floor
Redwood City, CA 94063

Dave Carbone
Transportation Systems Coordinator
City/County Association of Governments of San Mateo County
San Mateo County Office Building, 555 County Center, Fifth Floor
Redwood City, CA 94063

William Meeker
Community Development Director
City of Burlingame
501 Primrose Rd.
Burlingame, CA 94010

Maureen Brooks
Planning Manager
City of Burlingame
501 Primrose Rd.
Burlingame, CA 94010

Farhad Mortazavi
Community Development Director
City of Millbrae
621 Magnolia Ave.
Millbrae, CA 94030

David Petrovich, AICP
City Planner
City of Millbrae
621 Magnolia Ave.
Millbrae, CA 94030

Lisa Costa Sanders
Acting Planning Manager
City of San Bruno
567 El Camino Real
San Bruno, CA 94125

Aaron J. Aknin, AICP
Community Development Director
City of San Bruno
567 El Camino Real
San Bruno, CA 94125

Susy Kaulkin
Chief Planner
City of South San Francisco
400 Grand Ave.
South San Francisco, CA 94080

Jim Eggemeyer
Director
San Mateo County, Department of Planning and Building
County Office Building, 455 County Center, 2nd Floor
Redwood City, CA 94036

Eric Mar
Supervisor, District 1
City and County of San Francisco - Board of Supervisors
City Hall, 1 Dr. Carlton B. Goodlett Place, Room 244
San Francisco, CA 94102

Michela Alioto-Pier
Supervisor, District 2
City and County of San Francisco - Board of Supervisors
City Hall, 1 Dr. Carlton B. Goodlett Place, Room 244
San Francisco, CA 94102

David Chiu
Supervisor, District 3
City and County of San Francisco - Board of Supervisors
City Hall, 1 Dr. Carlton B. Goodlett Place, Room 244
San Francisco, CA 94102

Carmen Chu
Supervisor, District 4
City and County of San Francisco - Board of Supervisors
City Hall, 1 Dr. Carlton B. Goodlett Place, Room 244
San Francisco, CA 94102

Ross Mirkarimi
Supervisor, District 5
City and County of San Francisco - Board of Supervisors
City Hall, 1 Dr. Carlton B. Goodlett Place, Room 244
San Francisco, CA 94102

Chris Daly
Supervisor, District 6
City and County of San Francisco - Board of Supervisors
City Hall, 1 Dr. Carlton B. Goodlett Place, Room 244
San Francisco, CA 94102

Sean Elsbernd
Supervisor, District 7
City and County of San Francisco - Board of Supervisors
City Hall, 1 Dr. Carlton B. Goodlett Place, Room 244
San Francisco, CA 94102

Bevan Dufty
Supervisor, District 8
City and County of San Francisco - Board of Supervisors
City Hall, 1 Dr. Carlton B. Goodlett Place, Room 244
San Francisco, CA 94102

David Campos
Supervisor, District 9
City and County of San Francisco - Board of Supervisors
City Hall, 1 Dr. Carlton B. Goodlett Place, Room 244
San Francisco, CA 94102

John Avalos
Supervisor, District 11
City and County of San Francisco - Board of Supervisors
City Hall, 1 Dr. Carlton B. Goodlett Place, Room 244
San Francisco, CA 94102

Marty Van Dyn
Dir. Of Economic and Community Development
City of South San Francisco
400 Grand Ave.
South San Francisco, CA 94080

Jean Roggenkamp
Deputy Air Pollution Control Officer
Bay Area Air Quality Management District
939 Ellis St
San Francisco, CA 94109

Will Travis
Executive Director
San Francisco Bay Conservation and Development Commission
50 California Street, Suite 2600
San Francisco, CA 94111

Joe LaClair
Chief of Planning
San Francisco Bay Conservation and Development Commission
50 California Street, Suite 2600
San Francisco, CA 94111

Robert Batha
Chief of Permits
San Francisco Bay Conservation and Development Commission
50 California Street, Suite 2600
San Francisco, CA 94111

Cameron Johnson
South Branch Chief – Regulatory Division
US Army Corps of Engineers (San Francisco District)
1455 Market St., 16th Floor
San Francisco, CA 94103

Sean Cullinane
FAA Air Traffic Control Tower
1828 El Camino Real, Suite 705
Burlingame, CA 94010

Ryan Olah
Chief - Coastal Branch
US Fish and Wildlife Service (California and Nevada Region 8-Ecological Services)
2800 Cottage Way, Room W-2605
Sacramento, CA 95825

Charles Armor
Regional Manager
California Department of Fish and Game (Region 3, Bay Delta Region)
7329 Silverado Trail
Napa, CA 94558

Bob Smith
US Army Corps of Engineers (San Francisco District)
1455 Market St., 16th Floor
San Francisco, CA 94103

Shin-Roei Lee
Chief - Watershed Management Division
California Regional Water Quality Control Board (San Francisco Bay Region 2)
1515 Clay Street, Suite 1400
Oakland, CA 94612

Marla Lafer
WRCE
1515 Clay Street, Suite 1400
Oakland, CA 94612

Milford Wayne Donaldson
State Historic Preservation Officer
State Historic Preservation Officer
1416 9th St., Rm 1442-7
Sacramento, CA 95814

Nova Blazej
Manager, Environmental Review Office
US Environmental Protection Agency, Region 9
75 Hawthorne Street
San Francisco, CA 94105

Melissa Scianni
Life Scientist - Water Division
US Environmental Protection Agency, Region 9
75 Hawthorne Street
San Francisco, CA 94105

Robert Hargrove
Director of NEPA Compliance Division
US Environmental Protection Agency, Office of Federal Activities (within Office of External Affairs)
U.S. Environmental Protection Agency, Ariel Rios Building
1200 Pennsylvania Avenue, N.W. [Office of Federal Actions, Mail code: 2251A]
Washington, DC 20460

Stacy Cocke
Senior Planner, Capital Project & Environmental Planning
San Mateo County Transit District
P. O. Box 3006
San Carlos, CA 94070

Executive Officer
United States Coast Guard
USCG Air Station, SFO, Building 1020
San Francisco, CA 94128

Sophie Maxwell
Supervisor, District 10
City and County of San Francisco - Board of Supervisors
City Hall, 1 Dr. Carlton B. Goodlett Place, Room 244
San Francisco, CA 94102

Elisha Novak
Airport Planner, FAA Airports District Office, Burlingame
SFO/Community Roundtable
1828 El Camino Real, Suite 705
Burlingame, CA 94010

David F. Carbone
Roundtable Program Manager
SFO/Community Roundtable
1828 El Camino Real, Suite 705
Burlingame, CA 94010

Bert Ganoung
Manager, SFO Noise Abatement Office
SFO/Community Roundtable
1828 El Camino Real, Suite 705
Burlingame, CA 94010

Mike McCarron
Director, SFO Bureau of Community Affairs
SFO/Community Roundtable
1828 El Camino Real, Suite 705
Burlingame, CA 94010

SFO
COMMUNITY
ROUNDTABLE

San Francisco International
Airport/Community Roundtable

1828 El Camino Real, Suite 705
Burlingame, CA 94010
T (650) 692-6597
F (650) 692-6152
www.sforoundtable.org

January 3, 2011

Audrey Park
Bureau of Planning and Construction
San Francisco International Airport
Box 8097
San Francisco, CA 94128

Dear Ms. Park:

RE: Response to a Letter Regarding Preparation of a Federal Environmental Assessment (EA) for Relocation of the FAA Air Traffic Control Tower (ATCT) at San Francisco International Airport (SFO)

This letter is in response to a letter from Stephen Culberson, Director, Ricondo & Associates, dated December 22, 2010, regarding the above-referenced environmental assessment (EA) and related project at SFO. The San Francisco International Airport/Community Roundtable (Roundtable) was formed in 1981 to address community noise impacts from aircraft operations at San Francisco International Airport (see Roundtable Website at www.SFOroundtable.org). I understand the purpose of the proposed project includes the following elements:

- meet current seismic, building, and fire safety code standards
- support modernization of ATCT equipment and installation of future equipment
- maximize safety of air traffic operations
- minimize disruption to existing facilities and on-going terminal redevelopment efforts

The project consists of new construction (a new FAA ATCT) and demolition of existing selected structures on Airport-owned property within the existing SFO terminal complex. The project does not affect current or future air traffic routes in/out of SFO, nor does it directly or indirectly increase the number of aircraft departures/arrivals at the Airport. Therefore, the project does not affect the on-going aircraft noise mitigation focus/activities of the Roundtable.

Thank you for the opportunity to comment on the above-referenced project.

Sincerely,

David F. Carbone, Roundtable Program Manager

cc: Roundtable Members
Steve Alverson, Roundtable Coordinator
John Bergener, SFO Planning Manager

RoundtablecomletnewSFOATCT1210.doc

C/CAG

CITY/COUNTY ASSOCIATION OF GOVERNMENTS
OF SAN MATEO COUNTY

Atherton • Belmont • Brisbane • Burlingame • Colma • Daly City • East Palo Alto • Foster City • Half Moon Bay • Hillsborough • Menlo Park • Millbrae • Pacifica • Portola Valley • Redwood City • San Bruno • San Carlos • San Mateo • San Mateo County •South San Francisco • Woodside

December 31, 2010

Audrey Park
Bureau of Planning and Construction
San Francisco International Airport
Box 8097
San Francisco, CA 94128

RE: Response to a Letter Regarding Preparation of a Federal Environmental Assessment (EA) for Relocation of the FAA Air Traffic Control Tower (ATCT) at San Francisco International Airport (SFO)

Dear Ms. Park:

This letter is in response to a letter from Stephen Culberson, Director, Ricondo & Associates, dated December 22, 2010, regarding the above-referenced environmental assessment (EA) and related project at SFO. The City/County Association of Governments of San Mateo County (C/CAG) Board of Directors serves as the state-mandated airport land use commission for the county. The Board understands the purpose of the proposed project includes the following elements:

- meet current seismic, building, and fire safety code standards
- support modernization of ATCT equipment and installation of future equipment
- maximize safety of air traffic operations
- minimize disruption to existing facilities and on-going terminal redevelopment efforts.

Since all work associated with the project (new construction and demolition of selected existing structures) will occur on airport property, the project is not within the review/approval authority of the C/CAG Board of Directors.

Thank you for the opportunity to comment on the above-referenced project.

Sincerely,

Richard Napier, C/CAG Executive Director

cc: David F. Carbone, C/CAG Staff
John Bergener, SFO Planning Manager
Richard Newman, C/CAG Airport Land Use Committee (ALUC) Chairperson

ccagcomletNEWSFOATCT1210.doc

555 County Center, 5th Floor, Redwood City, CA 94063 PHONE: 650.599.1406 FAX: 650.361.8227
www.ccag.ca.gov

From: Lindy Lowe
To: Audrey Park
Subject: Relocation of the Airport Traffic Control Tower
Date: Friday, January 07, 2011 11:28:16 AM

Hello Audrey,

BCDC has reviewed the proposal for the relocation of the tower and it is something that BCDC supports and is an important project to move forward with. Let me know if you need anything else.

Best,
Lindy
--
Lindy L. Lowe
Senior Planner
San Francisco Bay Conservation
and Development Commission
(415)352-3642
lindyl@bcdc.ca.gov

RICONDO
& ASSOCIATES

January 13, 2011

California Native American Heritage Commission
915 Capitol Mall, Room 364
Sacramento, California 95814

RE: Environmental Assessment for Relocation of the Airport Traffic Control Tower
San Francisco International Airport

To whom it may concern:

On behalf of the City and County of San Francisco, Ricondo & Associates, Inc. (R&A), is preparing an Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and Federal Aviation Administration (FAA) guidance for the relocation of the Airport Traffic Control Tower (ATCT) at the San Francisco International Airport (Airport) in San Francisco, California. The FAA has requested that we contact the California Native American Heritage Commission to identify any Native American traditional cultural properties or land interests in the vicinity of the Airport that may be affected by the project.

The FAA, in cooperation with the City and County of San Francisco, completed a study in October 2008 that evaluated 21 potential relocation sites and recommended a site on Airport property located in an existing paved area in the courtyard between Terminals 1 and 2 (referred to as Courtyard 2) as the optimal site for a relocated ATCT. The general project location is shown in **Exhibit 1**, and a view of the Terminal Complex in **Exhibit 2** illustrates the existing and proposed sites for the ATCT.

The City and County of San Francisco are in the process of developing the EA, and plan to release the draft EA for public and agency review in April 2011. The EA will document the project's purpose and need, the proposed action and alternatives to the proposed action, the affected environment, and environmental consequences. Could you please search your records and let us know if there are any Native American traditional cultural properties or land interests in the vicinity of the San Francisco International Airport that may be affected by the project? If so, please provide contact information for potentially affected Native American tribes to my attention at the address below. I can also be reached by phone (312.212.8812 – direct line) or via email (s_culberson@ricondo.com).

Sincerely,

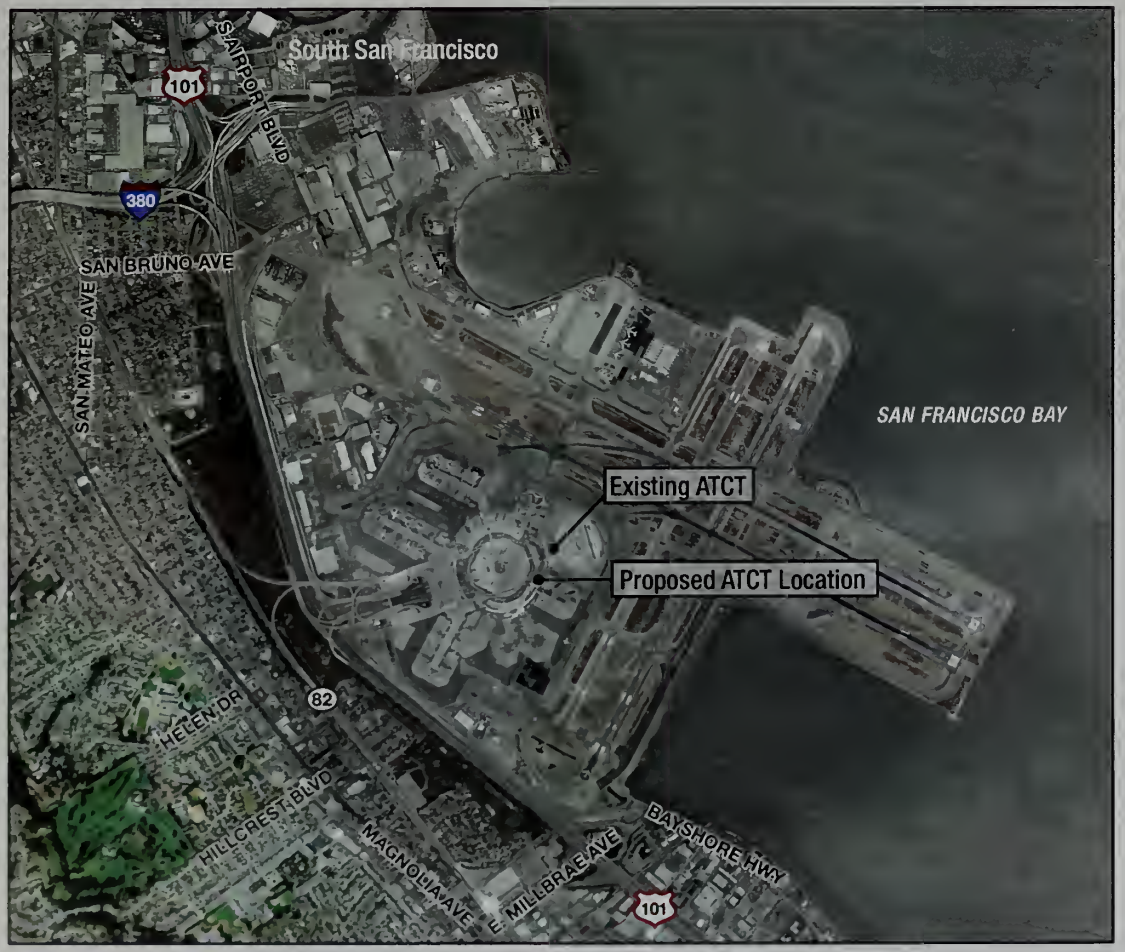
RICONDO & ASSOCIATES, INC.

Stephen Culberson

Stephen Culberson
Director

cc: 10010692-02
Read File

20 NORTH CLARK STREET, SUITE 1500, CHICAGO, IL 60602
TEL (312) 606-0611 FAX (312) 606-0706



Note ATCT = Airport Traffic Control Tower

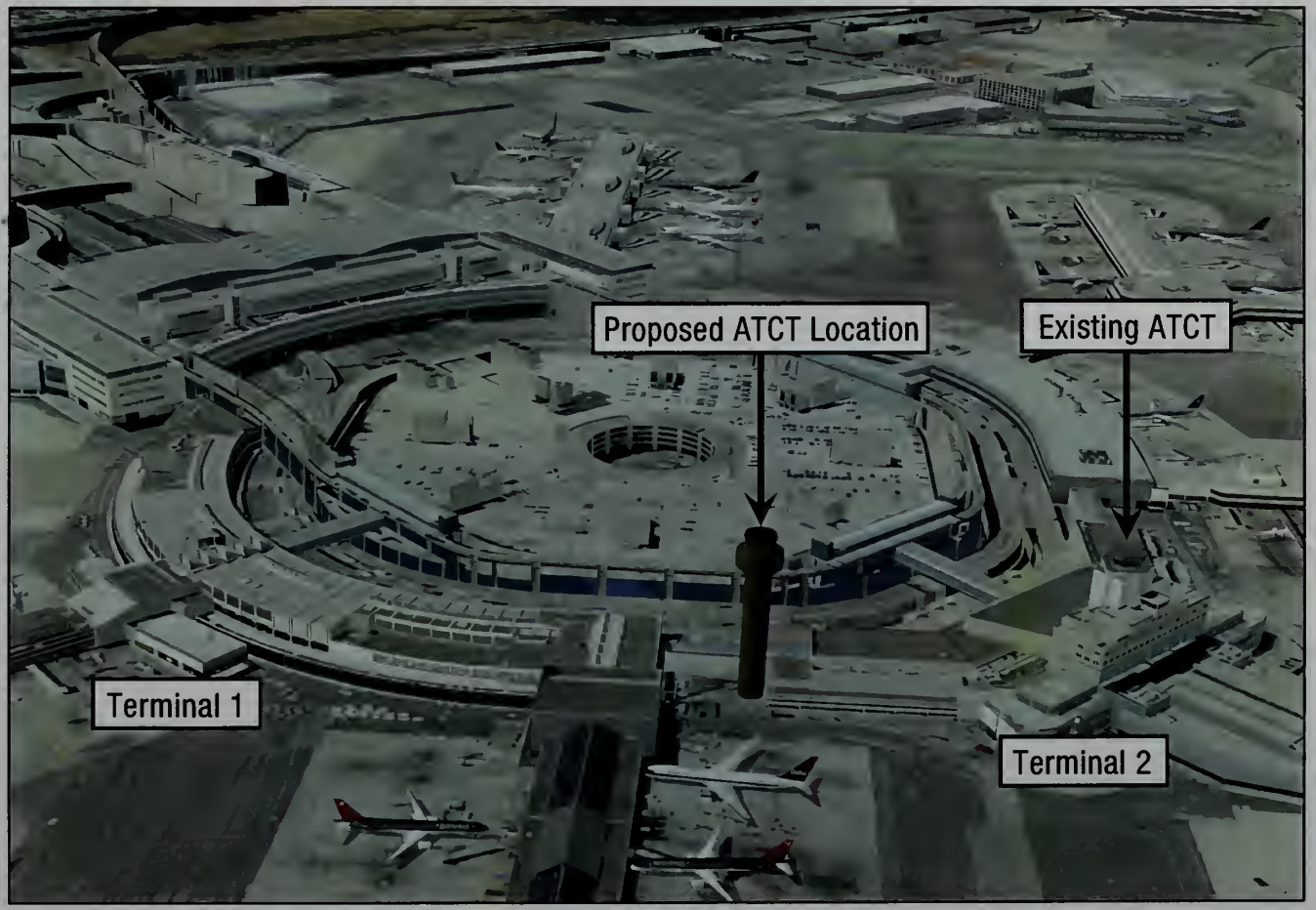
Sources Google Map Pro December 2010, Map Resources 2009
Prepared by Ricondo & Associates, Inc., December 2010.

Exhibit 1

Not to Scale

north

Project Location Map



Note: ATCT = Airport Traffic Control Tower

Source: Anna Fantoni, Bureau of Planning and Environmental Affairs, San Francisco International Airport, Presentation at the ACI-NA Operations and Technical Affairs Conference, San Diego, California, "Domestic Terminal Redevelopment Plan, Airport Planning and Development Case Studies," March 18, 2009.
Prepared by: Ricondo & Associates, Inc., December 2010.

Exhibit 2

Not to Scale

Terminal Complex

STATE OF CALIFORNIA Edmund G. Brown Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
Fax (916) 657-5390
Web Site www.nahc.ca.gov

February 3, 2011

Stephen D. Culberson
RICONDO & SSOCIATES, INC.
20 North Clark Street
1 Suite 1500
Chicago, Illinois 60602

Sent by Fax: 312-606-0706
Number of Pages: 2

Re: Proposed SF Airport project, San Mateo County

Dear Mr. Culberson:

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site Information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe or group. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional Information, please contact me at (916) 653-4038.

Sincerely,

Gloria Torres
for

Debbie Pilas-Treadway
Environmental Specialist III

Native American Coordination Addresses

Ms. Jakki Kehl

Ms. Linda G. Yamane

Honorable Irene Zwierlein
Chairperson
Amah/Mutsun Tribal Band

Honorable Ann Marie Sayers
Chairperson
Indian Canyon Mutsun Band of Costanoan

Ms. Jean-Marie Feyling
Amah/Mutsun Tribal Band

Honorable Rosemary Cambra
Chairperson
Muwekma Ohlone Indian Tribe of the San Francisco Bay Area

Mr. Andrew Galvan
The Ohlone Indian Tribe

Ms. Ramona Garibay, Representative
Trina Marine Ruano Family

U.S. Department
of Transportation

Federal Aviation
Administration

FAA Alaskan Region
ATO/WSA/Engineering Services

222 W. 7th Avenue, Box 14
Anchorage, Alaska 99513-7587

March 29, 2011

Mr. Milford Wayne Donaldson
State of California
State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, California 95816

Attention: Mr. Tristan Tozer

Dear Mr. Donaldson:

Proposed Relocation of the Airport Traffic Control Tower
San Francisco International Airport
San Mateo County, California
Section 106 Coordination

The City and County of San Francisco and the Federal Aviation Administration (FAA) are preparing federal environmental documentation for the proposed undertaking of the relocation of the FAA Airport Traffic Control Tower (ATCT) at San Francisco International Airport (SFO or the Airport). The proposed undertaking includes the construction of a 228-foot tall ATCT with a three-story base building that provides space for FAA office and other administrative activities. The ATCT would be integrated with a passenger corridor connecting Terminals 1 and 2; the departure level (level 2) would be shared by the FAA and SFO for concessions and restrooms as well as for pre- and post- security access corridors between Terminals 1 and 2. The proposed undertaking would also include demolition of the existing FAA ATCT facilities and associated office and mechanical space. For seismic safety and line of sight reasons, the City and County of San Francisco would demolish the existing ATCT facilities and the Airport administrative office space located on levels 4 through 10 of Terminal 2 when the relocated ATCT is commissioned and operational.

The City and County of San Francisco and the FAA are preparing an environmental assessment for the proposed undertaking pursuant to the National Environmental Policy Act of 1969.

The relocation of the ATCT is required because a seismic evaluation conducted in 2006 for the entire Terminal 2 building including the ATCT facilities (which are structurally integrated), determined that extensive upgrades were required for the building and ATCT facilities to meet current seismic, building, and fire code standards and that damage from a major earthquake could render the ATCT inoperable. It was further determined that while it would be possible to seismically upgrade the terminal building during the renovation project, there were no viable seismic retrofit options for the ATCT facilities. Any significant upgrades to the tower would be cost prohibitive and would be functionally impractical since the ATCT could not remain fully operational during the period of seismic retrofit and structural strengthening activities.[1]

1. Area of Potential Effect

The FAA is providing the following information on how FAA determined the boundaries of the Area of Potential Effect (APE) for the proposed undertaking. The proposed undertaking would occur in the central terminal core area on existing Airport property (see **Exhibit 1**). The APE was delineated based on the area that would be potentially physically disturbed during construction or needed for construction staging (see **Exhibit 2**). The proposed ATCT would be located in and adjacent to Courtyard 2 and Terminal 2, near Boarding Area C, Gate C41. Existing conditions at this site consist of asphalt-paved exterior areas and existing terminal buildings. Additional construction would occur in Terminal 2 for the demolition of floors 4 through 6 in the main structure and the existing ATCT above the existing Terminal 2 roofline (floors 7 through 10). Construction staging for the proposed ATCT would occur at Gate C41.

The APE boundaries were determined through consultation with the City and County of San Francisco on the extent of the proposed ATCT project. The proposed undertaking will not affect the number or type of aircraft using the Airport, thus FAA delineated a Direct Effects APE only. There would be no change in the indirect effects from aircraft noise resulting from the proposed undertaking. FAA will include this information in the environmental documentation for the proposed project. FAA is seeking comments from your office on the acceptability of the APE under Title 36 Code of Federal Regulations (CFR) Section 800.4 *Identification of Historic Properties*.

We are providing the following description of the Direct Effects APE for the proposed undertaking:

---

[1] Federal Aviation Administration, Los Angeles Terminal Engineering Center, *San Francisco International Airport, San Francisco, California, Airport Traffic Control Tower Site Survey Final Report*, October 2008.

FAA

Relocated Airport Traffic Control Tower (ATCT) Site: Exhibit 2 shows the Direct Effects APE (Physical Disturbance Area) for the proposed ATCT site. This APE includes the proposed ATCT site, the existing ATCT and Terminal 2 (portions of which will be demolished), and the construction staging area at Gate C41. The relocated ATCT would consist of a base building incorporated into a passenger corridor connecting Terminals 1 and 2, a tower shaft, and ATCT cab. The entire structure would be approximately 228 feet in height.

Pursuant to Title 36 CFR Section 800.4, the FAA is seeking concurrence with the APE for the proposed undertaking from the California State Historic Preservation Office.

2. Native American Consultation

On February 3, 2011, a letter listing Native American contacts for the proposed undertaking was received from the California Native American Heritage Commission. The Commission recommended FAA contact two representatives of the Ohlone/Costanoans; two representatives of the Amah/Mutsun Tribal Band; the Indian Canyon Mutsun Band of Costanoan; the Muwekma Oholone Indian Tribe of the San Francisco Bay Area; the Ohlone Indian tribe; and a representative of the Trina Marine Ruano Family.

On March 28, 2011, FAA provided detailed information about the Area of Potential Effect and the proposed undertaking via U.S. Mail to the tribal contacts listed above.

3. National Register Eligibility Determinations

Existing conditions at the site of the proposed undertaking consist of asphalt-paved exterior areas and existing terminal buildings. Additional construction would occur in Terminal 2 for the demolition of floors 4 through 6 in the main structure and the existing ATCT above the existing Terminal 2 roofline (floors 7 through 10). Construction staging for the proposed ATCT would occur at Gate C41.

According to information published on historic properties from the City and County of San Francisco, on the National Park Service's (NPS) National Register Information System (NRIS), from the State Office of Historic Preservation's (OHP) California Register of Historical Resources (CRHR), and from the Northwest Information Center (record search conducted on December 16, 2010), no known historic, cultural, or archaeological sites exist within the APE. The only National Register eligible property close to the APE is the U.S. Coast Guard's Air Station San Francisco. The U.S. Coast Guard Air Station San Francisco was determined to be eligible as a National Register Historic District in 1999. The historic district is adjacent to the Airport on the north side and is located more than 1 mile from the APE for the proposed project. The existing ATCT is located just over 1 mile (1.07 miles) southeast of the U.S. Coast Guard Air

Station San Francisco. The proposed ATCT would be located 1.12 miles southeast of the U.S. Coast Guard Air Station San Francisco.

A historical resources consultant conducted a study of the existing ATCT to determine its eligibility for listing as a historic resource as part of this project. Results of that study are attached to this letter as Attachment 1. Additionally, a visual impact assessment was also performed to determine whether visual changes would possibly affect historic resources outside of the APE (notably the U.S. Coast Guard Air Station San Francisco). Results of that assessment are also attached as Attachment 2.

Based on the evaluation of the two existing ATCTs at SFO (one constructed in 1954 and the other constructed in 1984), neither ATCT meets any criteria for inclusion on the National Register of Historic Places (see Attachment 1). The 1954 ATCT retains a low degree of integrity and is not associated with an important event or person, nor does it contain great information potential. The 1984 ATCT does not represent the first, last, or best of its kind, no scholarly work exists on the tower itself, and it is not part of a historic district. Thus, the FAA has determined that that these structures are not eligible for inclusion into the National Register of Historic Places.

The FAA has determined there are no historic properties within the APE for the proposed undertaking.

A Study Area was established for this project to examine areas that may be visually impacted by the proposed undertaking. The Study Area was defined as an area roughly 1 mile in diameter around the proposed ATCT location. A visual assessment on potential effects to the U.S. Coast Guard Air Station San Francisco Historic District concluded that the change in view with relocation of the ATCT would subtly change. Upon demolition of the existing ATCT and floors 4 through 10 of Terminal 2, views from the U.S. Coast Guard Air Station San Francisco should improve (see Exhibit 1 in Attachment 2). Thus, the FAA has determined that the proposed undertaking would have no effect on historic resources within the Study Area.

FAA seeks the California SHPO's concurrence with these determinations.

4. Assessment of Adverse Effects on Historic Properties

Since the FAA has determined there are no historic properties listed or eligible for listing on the National Register of Historic Places, and no archaeological sites have been identified within the APE, the FAA finds that the proposed undertaking will not affect any properties listed or eligible for listing on the National Register of Historic Places under 36 CFR Part 800.4(d)(1). FAA seeks the California SHPO's concurrence with this finding.

FAA

If you have any further questions concerning this matter, please call me at (907) 271-4471.

Sincerely,

John Louie
Environmental/NEPA Specialist
FAA ATO Western Service Area
john.louie@faa.gov

Enclosures:
Exhibit 1 – Project Location
Exhibit 2 – Area of Potential Effect
Attachment 1 – Historical, Archaeological, Architectural, and Cultural Resources Report
Attachment 2 – Visual Assessment

U.S. Department
of Transportation

Federal Aviation
Administration

FAA Alaskan Region
ATO/WSA/Engineering Services

222 W. 7th Avenue, Box 14
Anchorage, Alaska 99513-7587

March 28, 2011

Ms. Jakki Kehl
[redacted]

RE: Environmental Assessment for the Relocation of the Airport Traffic Control Tower at San Francisco International Airport

Dear Ms. Kehl:

The City and County of San Francisco initiated on behalf of the Federal Aviation Administration (FAA) the preparation of an Environmental Assessment (EA) for the relocation of the existing Airport Traffic Control Tower (ATCT or the tower) at San Francisco International Airport (SFO or the Airport). You and/or your organization were identified by the Native American Heritage Commission as potentially having knowledge of cultural resources in the project area. This letter is intended to solicit your comments regarding potential substantial, direct effects of the Proposed Action on your tribe or its resources. It provides a discussion of the purpose and need for the project, a description of the Proposed Action, and a brief discussion of the alternatives to the Proposed Action.

Background

The existing ATCT was commissioned in 1984, and has surpassed the 20-year life span for which it was designed. In 2000, SFO opened a new international terminal and closed Terminal 2 for renovations; however, the tower remains operational and is accessed through the terminal building. Renovation of Terminal 2 to convert it from an international aircraft terminal to a domestic terminal began in May 2008, and is expected to be completed in April 2011.

In 2006, while preparing to initiate the Terminal 2 renovation project, a seismic evaluation was conducted of the entire Terminal 2 building and the ATCT facilities, which are structurally integrated. The evaluation led to the determination that extensive upgrades were required for the building and ATCT facilities to meet current seismic, building, and fire code standards and that damage from a major earthquake could render the ATCT inoperable. It was further determined that while it would be possible to seismically upgrade the terminal building during the renovation project, there were no viable seismic retrofit options for the ATCT facilities. Any significant upgrades to the tower would be cost prohibitive and would be functionally impractical since the ATCT

could not remain fully operational during the period of seismic retrofit and structural strengthening activities.[1]

Purpose and Need for Project

A major earthquake could render the ATCT facilities at SFO inoperable, thus disrupting air traffic control operations at the Airport. To ensure that air traffic control operations at SFO are not disrupted by a seismic event, the City and County of San Francisco has identified the need to provide ATCT facilities that meet current seismic code standards. Furthermore, the City and County of San Francisco has identified the need to be able to support future equipment installations, support modernized equipment, and meet building and fire code standards.

To address the needs identified above, the City and County of San Francisco has identified the purpose of the Proposed Action (or the solution to the need) as the provision of ATCT facilities at SFO that:

- Meet seismic, building, and fire code standards;
- Accommodate future equipment installations; and
- Support modernization of ATCT equipment.

While meeting the purpose, alternatives considered for the Proposed Action should also maximize safety of air traffic operations and operational efficiency and minimize disruption to existing facilities and ongoing terminal redevelopment work.

Alternatives

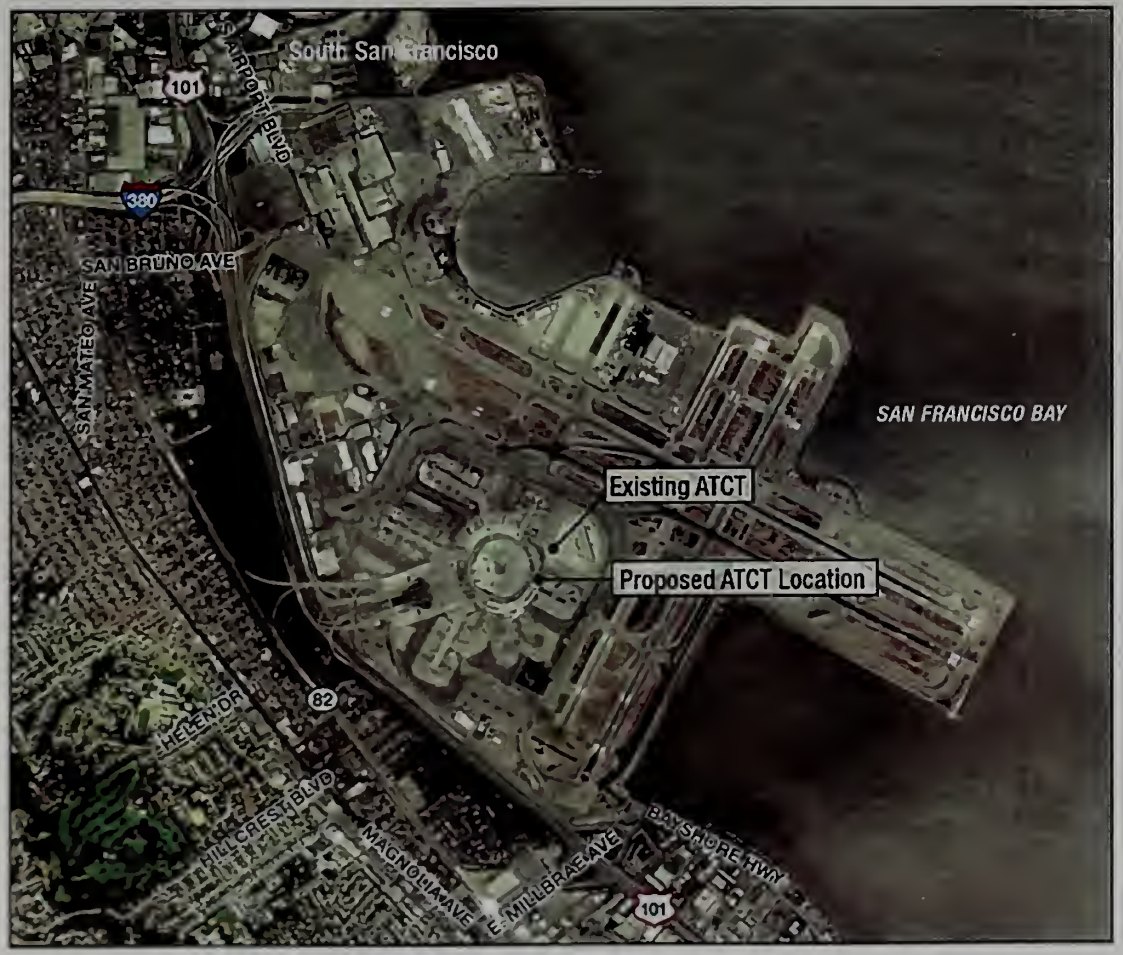
The FAA, in cooperation with the City and County of San Francisco, completed a study in October 2008 that evaluated 21 potential relocation sites and recommended a site in the courtyard between Terminals 1 and 2 (referred to as Courtyard 2) as the optimal site for a relocated ATCT within the Airport's Terminal Complex. The general project location is shown in **Exhibit 1**, and a view of the Terminal Complex in **Exhibit 2** illustrates the existing and proposed sites for the ATCT.

Proposed Action

The FAA ATCT functions, including the 195-foot tower and 525-square foot tower cab, currently located in Terminal 2 would be relocated to a proposed ATCT site in Courtyard 2, the area between Terminals 1 and 2. Specifically, the Proposed Action includes:

- **Relocation of the FAA ATCT.** The FAA ATCT functions currently located in ATCT facilities integrated with Terminal 2 would be relocated to a proposed new

[1] Federal Aviation Administration, Los Angeles Terminal Engineering Center. *San Francisco International Airport, San Francisco, California, Airport Traffic Control Tower Site Survey Final Report*, October 2008.



Note: ATCT = Airport Traffic Control Tower

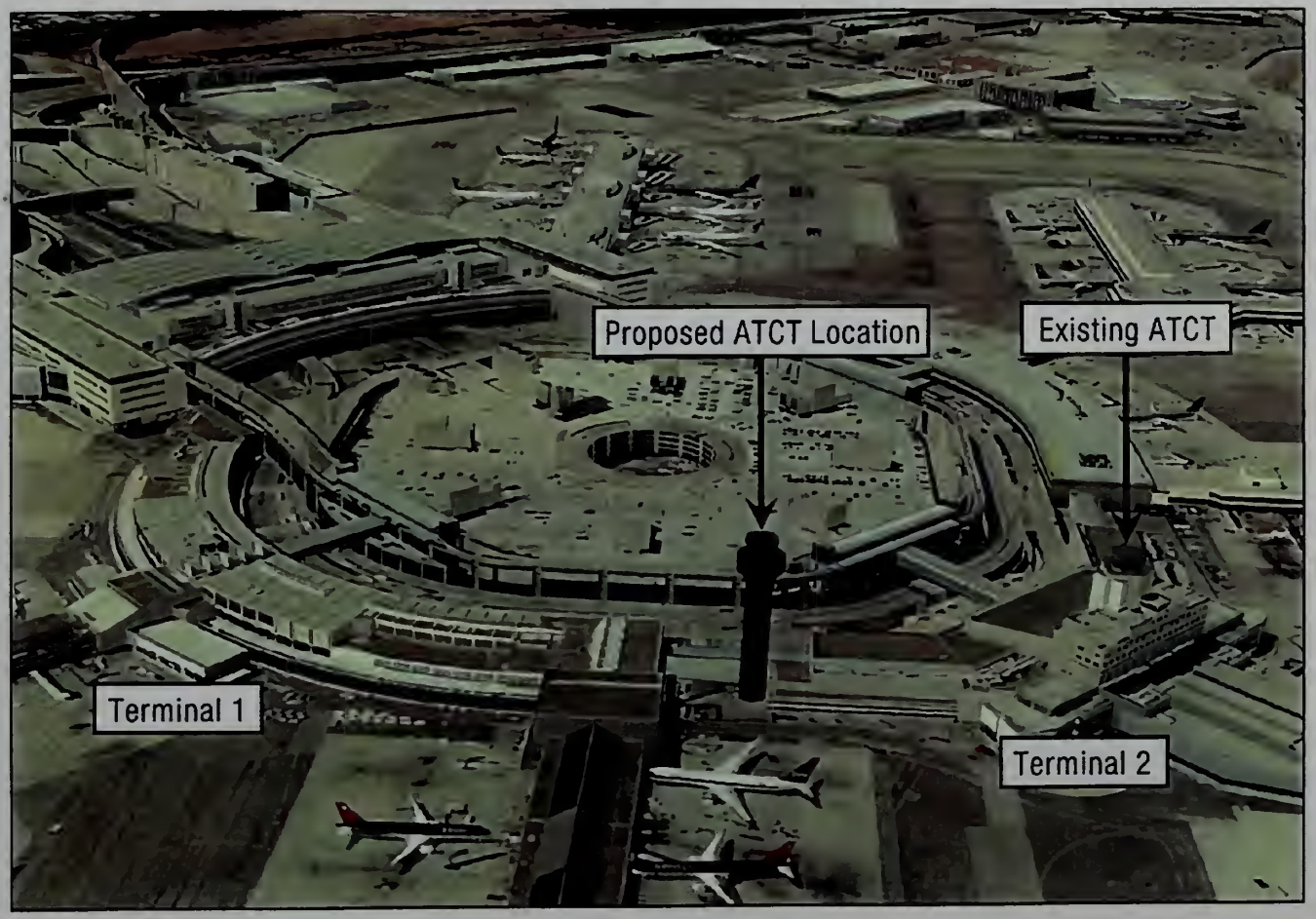
Sources: Google Map Pro December 2010; Map Resources 2009.
Prepared by Ricondo & Associates, Inc., December 2010

Exhibit 1

Not to Scale

north

Project Location Map



Note: ATCT = Airport Traffic Control Tower

Source: Anna Fantoni, Bureau of Planning and Environmental Affairs, San Francisco International Airport, Presentation at the ACI-NA Operations and Technical Affairs Conference, San Diego, California, "Domestic Terminal Redevelopment Plan, Airport Planning and Development Case Studies," March 18, 2009.
Prepared by: Ricondo & Associates, Inc., December 2010.

Exhibit 2

Not to Scale

Terminal Complex

ATCT that would be constructed at a site in Courtyard 2, the area between Terminals 1 and 2. The replacement tower would be 228-feet tall, the tower shaft would be 40-feet in diameter and topped by a 650-square foot tower cab. A three-story base building would provide space for FAA office and other administrative activities. The departure level (level 2) would be shared by the FAA and SFO for concessions and restrooms as well as for pre- and post-security access corridors between Terminals 1 and 2. In total, the FAA functions in the existing ATCT account for 30,900 square feet and would be relocated into 39,600 square feet in the Courtyard 2 location—representing an increase of 8,700 square feet in ATCT space.

- **Demolition of the existing Terminal 2 office space and the FAA ATCT Facilities and associated office and mechanical space.** For seismic safety and line of sight reasons, the City and County of San Francisco would demolish the existing ATCT facilities and the Airport Administrative office space located on levels 6 through 10 of Terminal 2 when the relocated ATCT is commissioned and operational.

EA Process and Schedule

The City and County of San Francisco are in the process of developing the EA, and plan to release the draft EA for public and agency review in April 2011. The EA will document the project's purpose and need, the proposed action and alternatives to the proposed action, the affected environment, and environmental consequences. If you believe that the Proposed Action will have substantial, direct effects on your tribe or resources, please inform me by April 28, 2011. Please address all comments to:

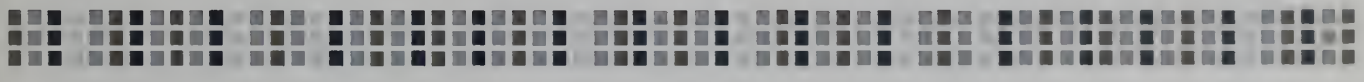
Mr. John Louie
Federal Aviation Administration
ATO/Tech Ops/WSA/Engineering Services
222 W. 7th Avenue, #14
Anchorage, Alaska 99513
Tel: (907) 271-4471
john.louie@faa.gov

Sincerely,

John Louie, PE
Environmental Engineer
FAA/ATO

Appendix F

Visual Resources



I. Existing Conditions

The greater San Francisco Bay region is a complex system of mountain ranges, valleys, and waterways that together create areas that are unique and not only define the character of the region but also contribute to the overall character of California. Some of these notable areas include the distinctive urban center of San Francisco, vertical cliffs of the Marin Headlands' Pacific Ocean coastline, and the San Francisco Bay. The region is characterized by panoramic views from the Santa Cruz Mountains and the Berkeley/Oakland hills; rolling hillsides that are developed or are grasslands that range from green and sprinkled with wildflowers in the spring to brown contrasting against stately oaks with dark green foliage in the summer; and numerous waterways traversed by vessels ranging from enormous tankers to small sailboats.

SFO is bounded by South San Francisco to the north; the San Francisco Bay to the east; Burlingame to the south; and Highway 101, San Bruno, and Millbrae to the west. Key viewpoints, shown in **Exhibit F-1**, have been chosen for their representation of the views of the Area of Potential Effect (APE). The vicinity is characterized by a mix of industrial, commercial, residential, and public recreational and open space uses. Views of the APE can be characterized by views from the waterfront and inland views.

1.1 Waterfront Views

Industrial, commercial, and recreational land uses are an established element along the Bay's shoreline. Land uses in this area are comprised of the multi-use Bay Trail, the South San Francisco commercial and industrial park at Oyster Point, and commercial development adjacent to the Bay Trail in Millbrae and Burlingame. Views toward the APE are readily available from waterfront locations with ground level views, such as from the Bay Trail (**Exhibit F-2**, Photo 1), and from the upper levels of buildings, such as hotels and businesses. These views are often sweeping and include the San Francisco Bay, its shoreline, surrounding development, and adjacent hills. However, these views are often limited by fog and haze. The Airport and the ATCT at Terminal 2 are an existing visual element along the waterfront, and the existing ATCT appears as a more prominent, vertical structure when viewed from closer versus farther distances in the middleground. There are no foreground waterfront views available to the public because of SFO's surrounding runways.

Views are also available from the historical United States Coast Guard Air Station San Francisco (USCG Station), which is located along the waterfront just north of SFO. The most direct views of the Action area are available from the entry and upper levels of the Rescue Unit building (Exhibit F-2, Photo 2) and from the overflow parking lot, both located on the southern edge of the USCG Station. These views include the existing ATCT, the tops of hangars and buildings associated with SFO, fencing, light posts rising above the fence line in the foreground and middleground, and the developed hills of Millbrae in the middleground. However, the majority of views from other locations on the USCG Station are limited by the buildings and landscaping on the site, in addition to offsite infrastructure such as screening fencing and buildings (**Exhibit F-3**, Photos 3 and 4).

Water-based views are available from the San Francisco Bay and include views from commercial and recreational watercraft. Views from watercraft are unobstructed, except when fog and haze limit views. Viewers on watercraft generally take in their surroundings at larger viewing angles and, therefore, observe their surrounding landscape as a more complete whole. They are less likely to single out a particular vantage unless there is a unique focal point. Fog and haze also greatly limit visibility from across the San Francisco Bay, a distance of approximately 10 miles, and views of the APE are normally not available (**Exhibit F-4**, Photo 5).

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Source: ICF International, February 2011
Prepared by: ICF International, February 2011

Exhibit F-1

0 1 mi

north

Representative Photo and Simulation Locations

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Photo 1: View looking northwest toward the Area of Potential Effect from the Bay Trail.

Photo 2: View looking south toward the Area of Potential Effect from the Rescue Unit building entry near the overflow parking lot.

Source: ICF International, 2010.
Prepared by: ICF International, February 2011.

Exhibit F-2

Representative Photographs

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Photo 3: View looking south toward the Area of Potential Effect from the U.S. Coast Guard Station boat ramp.

Photo 4: View looking south toward the Area of Potential Effect from the U.S. Coast Guard Station visitor's parking near the entry gate.

Source: ICF International, 2010.
Prepared by: ICF International, February 2011.

Exhibit F-3

Representative Photographs

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Photo 5: View looking southwest toward the Area of Potential Effect from the San Leandro Yacht Club, located on the eastern shoreline of the San Francisco Bay.

Photo 6: View looking northeast toward the Area of Potential Effect from Monterey Street at San Pablo Avenue

Source: ICF International, 2010.
Prepared by: ICF International, February 2011.

Exhibit F-4

Representative Photographs

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High quality views are offered by the sweeping panoramas provided by the waterfront. Human-made elements combine with the natural beauty of the San Francisco Bay and Santa Cruz Mountains to contribute to a setting that is moderately high in vividness, intactness, and unity to create an overall visual character that is moderately high.

1.2 Inland Views

Residential, recreational, commercial, and industrial land uses are located inland from the waterfront; some of these land uses are located on flatter terrain and others are elevated on the nearby hillside. There are no views of the APE from most of these land uses, whether on flat or elevated terrain, because fencing, landscaping, adjacent buildings and development, and infrastructure act to prevent views. Where views are present from residential areas, they are often limited by vegetation, buildings, and infrastructure so that only the upper levels of the existing ATCT are visible in the middleground (Exhibit F-4, Photo 6 and **Exhibit F-5**, Photos 7 and 8). The lower levels of the existing ATCT and administrative offices are not visible, and the existing ATCT is not a focal point or prominent feature in these viewsheds. From residential vantages on the hillside, there are sweeping views over surrounding development and the San Francisco Bay, some of which include the existing ATCT in the middleground (**Exhibit F-6**, Photo 9). These elevated vantages are at a further distance, but sometimes reveal more of the buildings associated with SFO, including the existing ATCT. However, the existing ATCT is not a prominent feature or focal point in the viewshed due to the predominance of other development, infrastructure, vegetation, and the San Francisco Bay in the viewshed. Views from recreational and commercial areas located inland are similar to views from residential areas in that views of SFO are often not available (Exhibit F-6, Photo 10) or are mostly limited by vegetation, surrounding development, and infrastructure (**Exhibit F-7**, Photos 11 and 12). Fog and haze also act to commonly limit or lessen views of SFO from inland areas.

Vantages from different points at the Airport also have views of the APE. These views are readily available from the AirTram lines that take passengers to and from the Airport (**Exhibit F-8**, Photo 13), from the concourse roadway (Exhibit F-8, Photo 14), from certain locations in the terminals, and from public-restricted areas, such as the hangars, ramp areas, taxiways, and runways. These views include the existing Airport buildings, terminals, and ATCTs. Construction elements are a common visual feature in the landscape due to the ongoing Terminal 2 renovation.

Views of SFO from the State scenic highway, I-280, and the Juan Bautista de Anza National Historic Trail (i.e., El Camino Real) are generally not available due to development, vegetation, and sound barriers. A few views are available where gaps in vegetation or development exist, such as near the Millbrae Avenue exit off of I-280 and off of El Camino Real near the Orchard Highway Supply store, as shown in Exhibit F-7, Photo 12.

Views inland from the waterfront are generally of moderate quality. While sweeping panoramas of the San Francisco Bay and waterfront are offered in some locations, most views are limited to the immediate surroundings. These immediate views consist of human-made elements such as buildings and infrastructure, characteristic of an area that is highly developed. However, the overall visual quality is improved because of vegetation and landscaping, historical architecture in various locations, and because views of the San Francisco Bay are present. All of these factors contribute to a setting that is moderate in vividness, intactness, and unity to create an overall visual character that is moderate.

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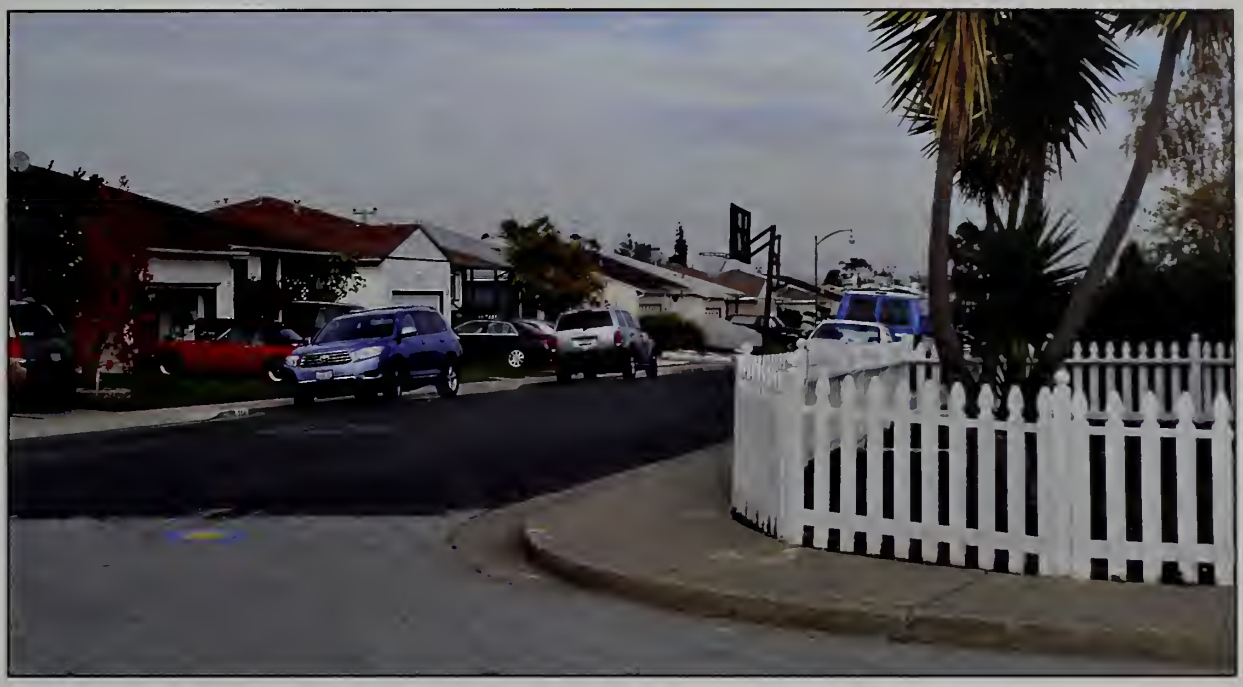

Photo 7: View looking northeast toward the Area of Potential Effect from Monterey Street at San Rey Avenue.

Photo 8: View looking northeast toward the Area of Potential Effect from Hemlock Avenue at Hermosa Avenue

Source: ICF International, 2010.
Prepared by: ICF International, February 2011.

Exhibit F-5

Representative Photographs

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Photo 9: View looking northeast toward the Area of Potential Effect from the Helen Drive near Tioga Drive.

Photo 10: View looking southeast toward the Area of Potential Effect from 7th Avenue Park.

Source: ICF International, 2010.
Prepared by: ICF International, February 2011.

Exhibit F-6

Representative Photographs

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Photo 11: View looking southeast toward the Area of Potential Effect from Lions Gate Park.

Photo 12: View looking northeast toward the Area of Potential Effect from the Orchard Supply Hardware store, located off of El Camino Real.

Source: ICF International, 2010.
Prepared by: ICF International, February 2011.

Exhibit F-7

Representative Photographs

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Photo 13: View looking southeast toward the Area of Potential Effect from the SFO AirTran Blue Line.

Photo 14: View looking northeast toward Terminal 2 from the terminal roadway

Source: ICF International, 2010.
Prepared by: ICF International, February 2011.

Exhibit F-8

Representative Photographs

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II. Viewer Groups and Viewer Response

2.1 Residents

Residents in the vicinity of the APE are located on flatter terrain, in closer proximity to SFO, and on the elevated hillsides of the Santa Cruz Mountains, further west. Residents are familiar with the developed nature of their surroundings, but are likely to have a high regard for views of the hills and San Francisco Bay. Because they live in the area, residents have the longest viewing times of the vicinity and would tend to have a higher sense of ownership of views. Therefore, residents are considered to have moderately high sensitivity to changes in the viewshed because of their prolonged exposure to such views and value placed on views associated with the San Francisco Bay and hills.

2.2 Recreationists

Recreational users view the APE from the San Francisco Bay and cities surrounding the APE. Recreational uses consist of walking, running, jogging, and bicycling along the waterfront and inland parks, trails, sidewalks, and roadways. Users of the San Francisco Bay, Bay Trail, and parks along the waterfront are likely to seek out sweeping views of the San Francisco Bay and areas along the shoreline. Waterway users have differing views, based on their location in the landscape, and are accustomed to variations in the level of industrial, commercial, and recreational activities in the vicinity of the APE. Most recreationists in the vicinity are moving around in the landscape and are not in one area for extended periods of time. However, viewer sensitivity is moderately high among recreationists because they are more likely to place high value on the natural environment, appreciate the visual experience, and be more sensitive to changes in views.

2.3 Commercial and Industrial

Commercial and industrial viewers have semi-permanent views from their respective facilities. Situated in different locations throughout the area, these facilities' views range from limited views of the foreground to sweeping views out to the middleground and background from higher elevations. Employees and patrons of these facilities are likely to be highly occupied with their work activities or tasks at hand. Because of their limited viewing times and focus on tasks at hand, this viewer group is considered to have moderately low sensitivity to changes in views.

2.4 Roadway Travelers

Travelers use roadways at varying speeds; normal highway and roadway speeds differ based on the traveler's familiarity with the route and roadway conditions (i.e., presence/absence of rain or fog). Single views typically are of short duration, except on straighter stretches where views last slightly longer. Viewers who frequently travel these routes generally possess low visual sensitivity to their surroundings. The passing landscape becomes familiar to these viewers, and their attention typically is not focused on the passing views but on the roadway, roadway signs, and surrounding traffic. Viewers who travel local routes for their scenic quality generally possess a moderately low visual sensitivity to their surroundings because they are likely to respond to the natural environment with a higher regard and as a holistic visual experience, yet would still be focused on the road and driving safely.

2.5 San Francisco International Airport

Viewers at SFO include employees working at the airport and other businesses at the SFO complex, people dropping off or picking up passengers, and airline passengers arriving and departing. All employees are accustomed to the Airport environs and visual landscape. Workers are focused on their tasks at hand and are familiar with Airport expansion and renovation, including the associated construction. People picking up or dropping off passengers only have brief views of the surrounding

environment, because such events often occur over a period of a few minutes. Passengers are only at the Airport for a short period of time, and once inside the terminal, their views to areas outside are limited by orientation of the terminals and intervening structures. While waiting for a flight, most passengers tend to occupy their time eating, reading, making phone calls, or using the computer, and most do not put a great deal of focus of views outside. Furthermore, the majority of views available to passengers occur upon landing and take-off and are often limited to those sitting in window seats. Because of these reasons, SFO viewers have low visual sensitivity to changes in views.

HEADQUARTERS

CHICAGO

20 N Clark Street, Suite 1500
Chicago, Illinois 60602
312. 606. 0611

NORTHERN CALIFORNIA

SAN FRANCISCO

221 Main Street, Suite 205
San Francisco, California 94105
415. 547.1930

PLEASE VISIT OUR WEBSITE AT:
www.ricondo.com